NETWORK WORLD
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NetWare mgmt. gets distributed

Novell shifts net control plan.

BY CARYN GILLOOLY

Dallas

Novell, Inc. is expected to bring much-needed relief to its largest customers this week with the unveiling of a new distributed network management strategy that may give the company the enterprise network status for which it has been striving.

At NetWorld 93 Dallas here, Novell is expected to reveal its NetWare Distributed Management Services (NDMS), the central piece of which is Version 2.0 of its NetWare Management System (NMS).

NMS 2.0, which has not been officially announced, will include support for the Simple Network Management Protocol Remote Monitoring (RMON) Management Information Base (MIB) as well as built-in LAN analysis capabilities.

Under the NDMS plan, Novell will reshape NMS to better reflect a client/server architecture and add a distributed, relational database that will bring the management system up to speed with the company's other products, sources said.

Today, NMS relies on a central database that houses all the management information of all servers throughout the enterprise net. This type of management is

See **NetWare**, *page 3*

INSIDE:
For more on Novell's LAN plans, turn to NetWare Special Issue, page 50.

Internetworking Trends

Hub, router vendors go head-to-head in remote office arena.

BY SKIP MacASKILL

It wasn't long ago that the networking sandbox was segmented into neat little play areas where the hub and bridge/router vendors kept to themselves and built their own castles.

That's all changing as the once-clear lines between the technologies blur and the hub and bridge/router players start fighting one another for account control.

This is painfully evident in the remote/branch office market, where hub vendors are offering integrated routing solutions in a direct challenge to bridge/router vendors and their standalone systems. Router makers are, in turn, developing simplified, lower cost routers for use in remote offices and acquiring hub technology to produce their own integrated devices.

The stakes are high because the remote access market is exploding, said

See **Head-to-head**, *page 80*

Buyout binge: NSC grabs Bytex, Coral goes to SynOptics.

BY MAUREEN MOLLOY

Local-area network hub leader SynOptics Communications, Inc. last week announced that it will acquire router start-up Coral Network Corp. for about $15 million, and router maker Network Systems Corp. (NSC) said it will buy hub supplier Bytex Corp. for approximately $47 million.

The announcements follow by a week Cisco Systems, Inc.'s shelling out of almost $90 million to acquire workgroup hub vendor Crescendo Communications, Inc. (*NW*, Sept. 27, page 3).

According to observers, the spate of acquisitions illustrate the growing rivalry between router and hub vendors as they try to stake similar claims in collapsed backbone networks. While distinct roles exist for each technology in enterprise nets, the two vendor camps will be rivals in the burgeoning work group switching arena.

See **Buyout**, *page 80*

NEWSPAPER
004

Codex tries the SoftCell with powerful ATM switch

BY JIM DUFFY AND MAUREEN MOLLOY

Mansfield, Mass.

Motorola Codex will join other combatants in the ATM fray this month when it introduces a high-capacity private network switch designed to anchor enterprise networks.

A key feature of the company's 6950 SoftCell ATM Networking Node will be its support for variable-length cells as well as standard 53-byte Asynchronous Transfer Mode cells. While ATM is optimized for T-3 rates and above, the variable cell lengths are intended to maximize bandwidth efficiency at T-1 speeds and below.

The SoftCell switch will be Motorola Codex's most significant product introduction in years and will play a key role in the company's effort to secure a place in future enterprise nets. "This is Codex's attempt to get back into the bandwidth management game," said Jeff Held, a partner at the Technology Services Practice of Ernst & Young in Vienna, Va.

Will it cell?

Key features of Motorola Codex's 6950 SoftCell Asynchronous Transfer Mode switch:

- 1G bit/sec cell bus
- 17 I/O slots
- Subrate, Nx64K bit/sec, fractional T-1, T-1/E-1 and T-3 support
- Frame relay interface
- Support for variable-length cells for more efficient bandwidth utilization at T-1 and sub-T-1 rates
- Data and voice compression, fault tolerance

SOURCE: *NETWORK WORLD*
GRAPHIC BY ANNE GIANCOLA

Indeed, SoftCell has been under development and anticipated for years (*NW*, May 25, 1992, page 25), during which time Motorola Codex has been reselling a fast packet switch from StrataCom, Inc.

SoftCell is a backbone switch designed to take in traffic from local-area networks, routers, terminal controllers, multiplexers, private branch exchanges and video coder/decoders, packetize it in ATM or variable-length cells, prioritize it and switch it to other SoftCell nodes.

Motorola Codex confirmed the name of the switch, which will be announced Oct. 19, but declined further comment.

Yet according to analysts briefed about the product, the SoftCell switch will sport a 1G bit/sec cell bus and

See **Codex**, *page 81*

IBM hubs, TCP/IP tools to get boost

BY MICHAEL COONEY

Boston

During the next few months, IBM will announce two new models of its 8250 LAN hub, complete with bridge/routing and 3174 controller modules, plus significant enhancements to its TCP/IP for MVS mainframe software.

At the IBM Networking Roadshow user conference here, IBM executives described a new generation of 8250 local-area network hubs — which may be announced later this month — that offer support for bridge/routing, 3270 devices, Asynchronous Transfer Mode (ATM) connections and wireless LANs.

IBM also detailed a new version of the company's Transmission Control Protocol/Internet Protocol for MVS software that includes more than 170 new features and said plans are in the works for a RISC System/6000 version of the TCP/IP offload facility, which currently runs on the 3172 Interconnect Controller.

On the hub front, IBM said it will add high- and low-end versions of the 8250 to its two existing models. The high-end

See **IBM hubs**, *page 9*

Middleware keeps MCI a step ahead

BY WAYNE ECKERSON

Washington, D.C.

In the intensely competitive telecommunications business, a week is a long time and a month almost an eternity.

Last year, MCI Communications Corp. introduced its highly successful Friends and Family calling program just six weeks after the idea was conceived.

For a $12 billion company that is growing 20% a year, such lightning-quick agility is astounding. One of the keys to MCI's success in speeding products to market is a flexible network computing architecture that can adapt to changing business requirements.

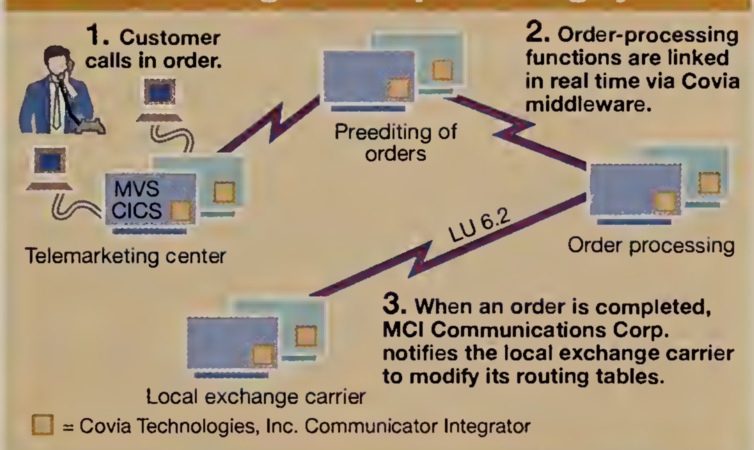
"It would have taken an extra three months to implement the Friends and Family program if we didn't have a solid infrastructure in place, which would have cost MCI $45 million in lost revenue," said Ralph Holmes, advisory engineer for the carrier.

MCI did not achieve these gains by downsizing or modifying its core applications — the current vogue in the industry — but rather by integrating legacy applications in a more efficient and reliable manner.

Holmes said a critical component of MCI's net computing infrastructure is message-oriented middleware from Co-

See **Middleware**, *page 81*

Streamlining a batch-processing cycle


1. Customer calls in order.
2. Order-processing functions are linked in real time via Covia middleware.
Preediting of orders
MVS
CICS
Telemarketing center
LU 6.2
Order processing
3. When an order is completed, MCI Communications Corp. notifies the local exchange carrier to modify its routing tables.
Local exchange carrier
☐ = Covia Technologies, Inc. Communicator Integrator

GRAPHIC BY SUSAN SLATER
SOURCE: *NETWORK WORLD*

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Fact: OS/2 2.1 runs DOS, Windows™ and more than 1,200 native OS/2 applications. With LAN Server 3.0 or Novell® NetWare,® OS/2 supports DOS, Windows, OS/2 and Mac clients. **Fact:** it's not likely NT will support all your existing applications. It won't run existing 32-bit applications like WordPerfect® 5.2 for OS/2 and Lotus® 1-2-3® for OS/2. It *will* require additional software to support DOS, OS/2 and even Windows clients. Worse yet, *Infoworld* sources report that Windows 3.x applications run *20% slower* under NT than they do under OS/2 2.1!

▲ *All this monkeying around with NT raises lots of questions. OS/2 has the answers.*

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Fact: OS/2 delivers powerful, reliable, client/server applications for data storage and retrieval (DB2/2,™ Oracle 7,® InfoPump™), communications (Communications Manager/2, REMOTE OS,™ TalkThru®), transaction processing (CICS, IMS Client Server/2 V2), comprehensive network management (LAN NetView,® CA-UNICENTER,® Domain/DACS,™ AlertView,™ Foundation Manager™), and more. **Fact:** The NT strategy is still Not There, and neither are native client/server applications.

Fact: OS/2 is committed to the industry-accepted Distributed Computing Environment (DCE) standards of the Open Software Foundation. **Fact:** NT is NoT.

Fact: NT still Needs Time to prove itself in the real world. **Fact:** OS/2 is used by millions worldwide. It's the leading, second generation, 32-bit Intel®-based operating system—a more stable, more developed version of the award-winning March, 1992 release.

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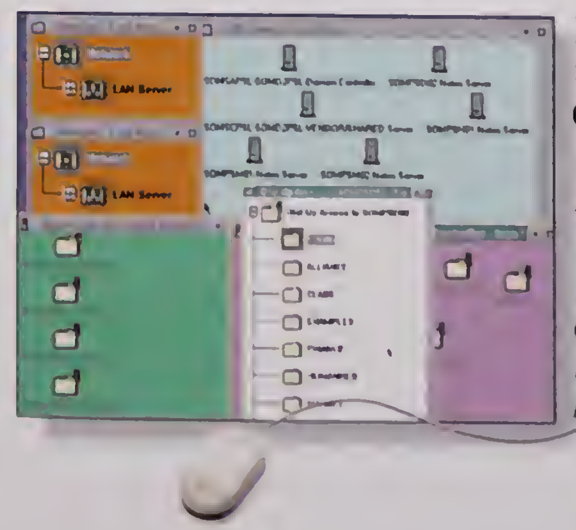
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It's time to separate the facts from the fiction…

Briefs

Novell loses another Unix leader. Joel Applebaum last week resigned as president and chief executive officer of Univel, a position he assumed when Novell, Inc. and Unix Systems Laboratories, Inc. (USL) formed the joint venture in December 1991. Univel became an integral part of Novell's Unix Systems Group earlier this year when Novell bought out USL. Novell would not say why Applebaum is leaving and did not say who will replace him. His resignation follows on the heels of the departure of Roel Pieper, former head of USL, who is now now president and CEO of Ungermann-Bass, Inc.

Government to give net protocols long hard look. The National Institute of Standards and Technology (NIST) last week put together an eight-member government review panel for Federal Networking Requirements to determine what role proprietary protocols and the two dominant standard protocols — the Internet Protocol suite and the Open Systems Interconnection suite — should play in the federal government's short- and long-term internetworking requirements. Chaired by Diane Fountaine from the Department of Defense, the panel will begin meeting in October and make its recommendations to Jim Burrows, director of the computer systems laboratory at NIST, by early January.

Sprint asks FCC to set conditions on BT/MCI deal. When MCI Communications Corp. in June proposed selling a 20% stake in the company to BT for $4.3 billion, the carrier said it would ask the Federal Communications Commission's blessing for the deal, even though it didn't actually need the commission's approval. Last week, Sprint Corp. took advantage of that pro forma review to challenge the alliance, telling the FCC the partnership could result in exclusive dealing between the two companies and discrimination against rivals. Sprint suggested imposing many conditions on the deal, including equal access to the U.K. market for U.S. carriers. MCI dismissed the proposal as an attempt by Sprint to hobble a rival.

Next version of APPN nears the gates. Third-party vendors attending last week's IBM APPN Implementor's Workshop (AIW) received the first specification for Advanced Peer-to-Peer Networking's High Performance Routing (HPR) feature. HPR will, among other things, let APPN nets dynamically route data around network failures and provide a three- to tenfold net performance improvement. The AIW promptly formed a special interest group to further develop the specification. IBM also said most of the work on Systems Network Architecture Management Information Base development was done and vendors could begin implementing it in products possibly by next June.

Microsoft delivers ODBC update. Microsoft Corp. last week issued beta versions of its Open Database Connectivity (ODBC) 2.0 software development kit to developers attending the ODBC Developers' Conference in Redmond, Wash. ODBC is a Microsoft specification designed to provide connectivity between Windows applications and multiple databases. ODBC 2.0, which adds support for 32-bit operating systems, will be available in its final form within six months, according to Microsoft officials.

Software AG and Apple team up. Apple Computer, Inc. last week turned to Software AG to provide the infrastructure needed to give life to Apple's Virtually Integrated Technical Architecture Lifecycle, a blueprint for building enterprisewide client/server applications. Under the agreement, announced in Frankfurt, Germany, Apple will use Software AG's Entire suite of middleware products to build a toolkit that will make it easier for developers to integrate Apple applications with legacy systems.

Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at 300 to 2,400 bit/sec (8N1) at (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Susan Collins via any of the above means.

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Can you help me find information on faxing via the Internet?

Jerome McNamara, Washington, D.C.

Mark Gibbs, a Ventura, Calif.-based writer, consultant and author of the book Navigating the Internet *replies:*

Faxing on the Internet is a relatively new and more or less experimental service, although a commercial service is now available.

In principle, faxing on the Internet is equivalent to remote printing. You send electronic mail to a facsimile service site; a computer on the Internet acts as a fax distribution point. Each site serves a restricted area such as an area code or a city. Most of the sites don't charge for the service... yet.

There are fax sites in Washington, Silicon Valley, San Francisco and a few other areas of the country. Others are expected to come on-line in Japan, Australia, the Netherlands and Ireland.

You can get more information on this service by sending an Internet E-mail message to tpc-faq@town.hall.org.

If you're looking for a commercial service on the Internet, there's FAXiNET, which offers fax services worldwide as a subscription service. For corporations, the charges are $35 to join, $10 a month as a service fee and about 49 cents per page sent. (Different rates apply to different countries). They also offer accounts for individuals and departments.

For more information on FAXiNET, send an Internet message to info@awa.com with the word HELP in the body of the message.

Can you tell me the difference between Novell, Inc.'s NetWare 3.11 and Server Fault Tolerance (SFT) Level III?

Marc Brillon, Pawtucket, R.I.

Ronald Nutter, escalation manager of 900 Support, an around-the-clock Novell technical support company in Lake Oswego, Ore., replies:

SFT III is Novell's mirrored server version of 3.11. SFT III takes you a step beyond mirrored or

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NetWorld 93 spotlight to shine on Novell and its third-party partners

LAN maker in joint deals with AT&T, Lotus, Citrix and others.

BY CARYN GILLOOLY

Dallas

Novell, Inc. will easily dominate the agenda at this week's NetWorld 93 Dallas with big technology introductions, as well as a slew of announcements about joint efforts with key industry players.

Topping Novell's list is an expected joint development and licensing agreement with Citrix Systems, Inc. to tie its WinView For Networks application server with Novell's recently announced NetWare Connect remote connectivity product, according to sources.

Novell and AT&T will announce plans to deliver on the LAN-based telephony products mapped out earlier this year. And a channel announcement with Lotus Development Corp. will see Novell's resellers offering Notes to customers.

Finally, Novell also plans a virtual AppWare extravaganza, with the release of the first AppWare software development kits as well as support announcements from major third-party vendors.

NITTY GRITTY

Coral Springs, Fla.-based Citrix's WinView for Networks is a combination remote control and application server that lets remote users dial into a LAN and access Windows applications on an application server. The product sends only screen updates to the remote user, maximizing performance and minimizing data exchange over low-speed dial-up links.

> **Novell is expected to release the first set of APIs that will let independent software vendors write applications that work within the AppWare framework.**

Under terms of this week's agreement with Citrix, Novell is expected to integrate WinView for Networks into its own NetWare Connect product. With the combination, users will be able to dial in and access NetWare files and applications as if locally attached — thanks to NetWare Connect — as well as applications supported by WinView for Networks.

Announced in early January of this year, Novell's agreement with AT&T is expected to bear fruit this week with the release of Telelphony Services for NetWare products.

Central to the products will be the Telephony Server NetWare Loadable Module (NLM) that will link a NetWare server to an AT&T's Definity private branch exchange to let customers use telephone features, such as auto-dialing, conference calling and message management, in combination with information stored on the network.

Telephony Services for NetWare products will also include the AT&T PassageWay desktop application, which will let customers speed-dial and take notes associated with individual phone calls.

In addition to their own products, Novell and AT&T are also expected to bring out a set of application programming interfaces (API) that will let third-party developers write applications that use the local-area network-based telephony services.

On the sales side, Lotus and Novell are expected to introduce the Lotus Reseller Program, under which the companies will work together to educate Novell's reseller channel about Notes — what it is, how it works and how to support it. This is likely the preparation for a future announcement under which Lotus will sell its Notes NLM through Novell's reseller channel.

Finally, Gupta Corp. will be one of a number of application development vendors expected to endorse Novell's AppWare application development platform this week by linking their application development tools into AppWare. Specifically, Gupta is expected to announce Application Loadable Module versions of its SQLBase, SQLWindows and Quest products that will help users develop AppWare-based applications.

But equally as important, Novell is expected to release the first set of APIs that will let independent software vendors write applications that work within the AppWare framework.

NetWare

Continued from page 1

simply not feasible for large enterprise nets. Under NDMS, management information will be distributed and accessible from anywhere on the net.

"If you're at a company with 28,000 servers, you definitely will want a distributed database," according to one anonymous source familiar with the announcement.

Although Novell is not expected to announce specific ship dates or even product plans, the new database will be an integral part of NMS.

According to sources, the database will be the one offered by Serius Corp., which is owned by Novell. Currently, the Serius database is being used as part of Novell's AppWare to provide cross-platform application support. This means developers can write applications on any number of platforms that can access the Serius database.

In the context of NMS, cross-platform connectivity means an administrator can not only use multiple types of systems, such as Unix or Apple Computer, Inc. Macintosh machines, as NMS Consoles, but also gather information from different systems. NMS currently uses Novell's Btrieve database, which only supports DOS- and Windows-based systems.

"This would make it much easier to map, administer and manage the network," one third-party developer said.

This software change also means developers will have to retool existing applications to work with the new database, but most seemed supportive and said they would retool their products, if necessary.

Shorter term changes evident in NDMS revolve around the new version of NMS, which will consist of three components: an NMS Agent, an NMS Server and an NMS Console.

The NMS agent is a terminate-and-stay resident program that runs in each device to be managed. The agent sends management information data to the NMS Server, where most of it is processed. From the NMS Console application, the administrator can see and manipulate the net information within the server.

With today's Novell management scheme, most of the processing is done at the console level. Moving the processing to the servers and having the requests come from the console make the new NMS much more client/server-oriented and efficient.

Also at NetWorld this week, Novell will enhance its NetWare Global Message Handling Service (MHS) by adding support for Microsoft Corp. MS Mail client applications. NetWare customers using Microsoft's MS Mail can only access NetWare Global MHS through a gateway. This, however, prevents users from accessing NetWare-specific Global MHS features.

See **NetWare**, *page 9*

Microsoft to beef up Windows for Workgroups

BY CARYN GILLOOLY

Dallas

Microsoft Corp. will join in the NetWorld fun this week, when it rolls out a new version of its Windows for Workgroups peer-to-peer networking product.

Dubbed Windows for Workgroups 3.11, the new version is expected to have built-in facsimile capabilities as well as enhanced security and support for centralized management, according to users that are beta-testing the software. The new version is also expected to give users new options by supporting Novell, Inc. Open Data Link Interface drivers in addition to Microsoft Network Driver Interface Specification drivers previously supported.

Microsoft confirmed the pending Windows for Workgroups release but would not confirm details.

In the current 3.1 version of Windows for Workgroups, users are responsible for managing their own stations. If one person wants to share a file with another person, the first user has to manually change the rights of the file.

In addition, all users have to update or change their own systems to reflect network changes — a potential problem for those who are not network savvy.

"The new central administration capabilities let one person administer the network," said a beta user who requested anonymity. "There's usually at least one person on the network that likes tinkering around and acting as the administrator, so it works out well."

The single administrator also leads to enhanced security. Previously, users administered their own access rights; all security can now be monitored from a single station. In addition, each new version of Windows for Workgroups will include a copy of Microsoft at Work fax-sharing software to let users share a fax modem over the network.

Windows for Workgroups 3.11 will be available by the end of October.

SynOptics' long-awaited System 5000 hub debuts

BY SKIP MACASKILL

Santa Clara, Calif.

SynOptics Communications, Inc. last week rolled out its next-generation Lattis System 5000 hub, a multigigabit-capacity device that combines switching capabilities with distributed management to serve as a control point for collapsed backbones.

The 5000 is at the heart of a new star-of-stars topology, dubbed structured networking, being touted by SynOptics. The 5000 will sit in the center of a network interconnecting work group and departmental hubs throughout a campus via switching. The hub will also act as a central control platform that allows an administrator to oversee an entire net by pulling management and traffic analysis data from all connected devices.

"The 5000 is a hub of hubs that brings different technologies together and makes them work in concert," said Andrew Ludwick, president and chief executive officer of SynOptics. "By tightly integrating net management into the device, users get better control over their networks."

The hub is a 14-slot device that supports as many as 52 Ethernet, 26 token-ring or five Fiber Distributed Data Interface network segments across a three-tiered backplane. One slot is reserved for a management module.

The hub provides 12G bit/sec of aggregate capacity when all three backplanes are fully utilized. One backplane supports 12 Ethernets and nine token rings, as well as the common management bus, which is used to control the 5000 and connected devices.

A separate FDDI backplane supports five FDDI rings, and the third backplane is divided into a 10G bit/sec portion that can support two of SynOptics' FastMatrix Asynchronous Transfer Mode switch modules, and a 2G bit/sec segment for fast frame switching modules for technologies such as 100M bit/sec Ethernet. The modules that can take advantage of the third backplane will be part of a future release.

The 5000 is made to link LattisNet System 3000 and 2000 hubs in work group and departmental local-area networks throughout a campus net. To facilitate those connections, SynOptics rolled out new cluster modules that support fiber downlinks from the hubs.

The modules come in Ethernet and token-ring versions. The Ethernet model can support as many as four 3000s or 2000s so the hub can provide connectivity for as many as 52 Ethernet segments when fully configured with cluster modules.

For each of the four hub connections, the cluster module also offers four copper-based ports that can provide connectivity to a centrally located server cluster or a local Ethernet segment.

The token-ring cluster module offers connectivity for up to two 3000s or 2000s — for a maximum of 26 token rings — as well as four copper-based ports for each of the hub connections.

The hub supports distributed Simple Network Management Protocol-based capabilities through Data Collection Engines (DCE), which are multiprocessing daughterboards for

See **SynOptics**, *page 7*

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Lotus provides a glimpse of the future and its new technologies

Development, forms routing tool key to work group strategy.

BY WAYNE ECKERSON

Boston

Lotus Development Corp. last week offered a cadre of journalists and analysts a sneak preview of products and technology it will unveil during the next 12 to 18 months, including an application development tool, forms routing software and a voice response system integrated with Notes.

The occasion gave Lotus officials a chance to bask in the glow of recent successes that have boosted the company's stock price to their highest point in five years. These include the launch of its 1-2-3 Release 4 spreadsheet for Windows and its undisputed preeminence in the work group computing market, thanks to the rising popularity of Notes and continued strong performance of cc:Mail messaging products.

JOHN THOMPSON

MANZI

Appearing relaxed and confident, Lotus Chief Executive Officer Jim Manzi said that one of Lotus' key objectives is to dominate the work group computing market, which will be worth approximately $1.5 billion by 1997. He added that Lotus expects to record $250 million in revenue from sales of Notes and cc:Mail for 1993, garnering more than a 30% share of the work group computing market.

''We've been executing our strategy around work group computing and communications well,'' Manzi told the audience, which included 95 foreign journalists who Lotus flew in for the event.

Manzi said Lotus' other key objectives are to break new ground in the area of mobile computing and enhance its desktop applications by improving the user interface and adding work group-enabling features.

NEW PRODUCTS

In response to a number of customers who are eager to build applications integrating data from Notes and SQL databases, Lotus is working on an application development tool code-named Notebook.

Under development for two years, Notebook will include a graphical user interface builder, a utility for building charts and a Visual Basic-like macro language called LotusScript, which Lotus plans to incorporate in all of its desktop applications. The product, which will be sold in developer and run-time versions, will let users query and update Notes and SQL databases.

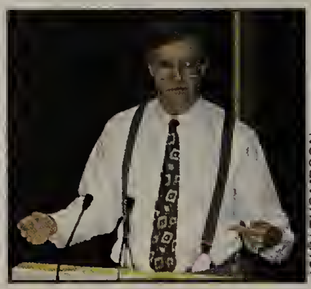
Besides Notebook, Lotus plans to increase accessibility to external data sources for Notes users in three ways.

Last month, the company shipped Lotus DataLens drivers for Notes 3.0 that will let users access about a dozen SQL and personal computer databases. Later this year, Lotus plans to issue Open Database Connectivity drivers for Notes, which will give Notes users access to an wider range of SQL databases. Also, the firm is building a product called Notesbridge based on Trinzic Corp.'s InfoPump that will transfer large chunks of data between Notes servers and database management servers.

Lotus will make a noticeably delinquent entry into the work flow arena when it announces Lotus Forms sometime next year. Lotus Forms will consist of a forms designer and execution modules, and will run on Windows, Macintosh, DOS, Unix and OS/2 clients. It will route forms via electronic mail systems compliant with Lotus' Vendor Independent Messaging (VIM) or Microsoft Corp.'s Message Application Programming Interface. Lotus Forms will appear as attachments in cc:Mail and as Object Linking and Embedding (OLE) objects in Notes via the Notes/FX utility. Notes/FX, which is being embedded in all Lotus desktop applications, is a key tool for Notes-enabling an application program.

Using OLE 1.0 and the Notes API, Notes/FX allows users to have predefined pieces of information in an application show up as fields in a Notes form and vice versa. Notes/FX allows users to disseminate data and the programs needed to edit that data throughout an enterprise network via Notes.

Some of the more exotic products demonstrated at the briefing included Phone Notes, Video Notes and ScreenCam. Phone Notes, which is being developed in conjunction with Simpact Associates, Inc., allows users to dial into a Notes server using a telephone keypad and request Notes to fax a specific document to them.


JOHN THOMPSON

LANDRY

Video Notes, which will not be available for two to five years, allows two Notes users to conduct a real-time, full-motion videoconference across a campus-based fiber net.

ScreenCam allows Lotus desktop users to create training programs or enhanced messages by recording their keystrokes, voices and screen activity. This recording can be embedded in on-line help programs or sent to others via E-mail. John Landry, Lotus' chief technology officer, said Lotus is trying to figure out ways to compress sound files so ScreenCam files do not consume too much disk space.

On the messaging and mobile front, Lotus is working on a version of cc:Mail Mobile for Windows and Macintosh that will provide laptop users access to wired and wireless networks.

Currently, Lotus has a DOS version of the product and a version that is hard-coded into Hewlett-Packard Co.'s 100LX palmtop computer and works with Ram Mobile Data, Inc.'s wireless network.

Landry said Lotus is reluctant to produce software for the emerging line of personal digital assistants (PDA) because they do not offer strong enough communications capabilities. However, a source close to the firm said Lotus is talking with one manufacturer of PDAs and will announce a partnership agreement in the next several months.

Lotus is reluctant to produce software for the emerging line of PDAs because they do not offer stong enough capabilities, Landry said.

Two weeks ago, Lotus announced a strategy for more tightly integrating cc:Mail and Notes Mail using a single message router. That router will come bundled with a Notes Server and support a new client/server version of cc:Mail that will use the cc:Mail front-end and the Notes message store (*NW*, Sept. 27, page 5).

☎Lotus: 617 577-8500

Big rate increases on the way for switched transport

BY BILL BURCH

Washington, D.C.

Large users of switched transport services got a shock late last month when they received letters from local exchange carriers telling them to prepare for a large increase in access rates on Dec. 1.

Tariff analysts said the increases will affect hundreds of users across the U.S. and stem from the Federal Communications Commission's general restructuring of switched access rates.

''The new rates will mean an average increase of 10% to 30% for most switched transport users,'' said Susan Gately, a vice president at Economics & Technology, Inc., a Cambridge, Mass., tariff analysis firm that has reviewed some of the local carriers' filings. ''I have seen instances where the increases will exceed 50%.''.

The new rates will run through Nov. 30, 1995. The FCC is working on a permanent rate structure that will take effect in December 1995. To give customers warning about December's rate changes, the FCC required the carriers send out letters in September breaking down the increases for a sample user.

US West, Inc., for example, priced out switched transport service for a customer with 3,650 minutes of traffic and an eight-mile switched transport link. Under the current pricing plan, the customer pays a per-minute charge for each of four service elements. The total

See **Rate**, *page 7*

SMC's new module opens door to token-ring switching

BY SKIP MACASKILL

Hauppauge, N.Y.

Ethernet switching is not the only game in town anymore.

Standard Microsystems Corp. (SMC) last week rolled out a module that brings switched token ring to its intelligent switching hub, offering users dedicated 16M bit/sec links to a single device or work group.

The announcement marks the second time in as many weeks that high-speed networking options have been presented for token-ring users. Last week, Hewlett-Packard Co. and IBM unveiled plans to develop a 100M bit/sec standard for token ring (*NW*, Sept. 27, page 1).

Several other vendors are feverishly working on token-ring switching capabilities, and analysts expect announcements will be made by year end.

SMC's new Quad Token-ring I/O Module (QTIOM) is a four-port switching module that resides in the company's Elite SwitchingHub (ES)/1. When fully configured with five QTIOMs, the ES/1 can provide 20 dedicated 16M bit/sec pipes to servers, clients, front-end processors, communications controllers and individual segments.

The QTIOM, based on two Advanced Micro Devices, Inc. 29000 Reduced Instruction Set Computing chips, has a switching rate of 20,000 64K-byte packet/sec for each port.

The new modules, which support the Simple Network Management Protocol, are available in both shielded and unshielded twisted-pair versions.

Joe McCarthy, assistant vice president of information systems at USG Annuity & Life Co. in Des Moines, Iowa, said he expects a twofold benefit from the QTIOM once he installs it this month. ''We have an optical imaging system with over 1.5 million images stored on-line that we run over our token-ring network,'' McCarthy said. ''Switched token ring will allow us to pass those images around the network more efficiently.''

USG is also consolidating its four token-ring servers with seven Ethernet servers from its sister company, Equitable Life Insurance Co. of Iowa. The servers will be centrally located on one LAN and connected to QTIOM modules in an ES/1.

That hub will be connected to other ES/1s at Equitable and USG via a Fiber Distributed Data Interface backbone, providing switched access to the server cluster and relieving server bottlenecks for both companies.

Todd Dagres, vice president of data communications at The Yankee Group, a Boston-based consulting firm, expects other token-ring users will also welcome the product.

''Token-ring users are no different than their Ethernet counterparts in wanting more bandwidth and performance to enhance their network capabilities,'' he said. ''SMC is providing a robust switching option for them, and the addition of token-ring switching makes the ES/1 the best LAN switch available on the market today.''

The QTIOM is also well positioned as a collapsed backbone device supporting a number of work groups.

''Because each QTIOM port can handle several addresses, users can connect a separate work group to each port, using the module to switch traffic as needed,'' he said.

The ability for each port to handle multiple addresses also makes the module more cost-effective, Dagres said. ''The $2,500 per-port price is high, but if you have five or six users on one segment attached to one of the QTIOM ports, you drop the per-user cost down to between $400 and $500.''

Available in December, the QTIOM will cost $9,950.

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IBM to unite imaging systems

BY BOB BROWN

New York

IBM last week outlined plans to unite its disparate imaging systems under a common architecture and offer client/server versions of its existing host-based systems.

The architecture would provide customers with a framework for building an enterprise imaging system — using a variety of IBM imaging products and computer platforms — that would enable end users to access images stored anywhere on a network.

"The intent is to allow customers to start with a small number of users in a pilot, grow that pilot to satisfy the department's needs and then be able to interconnect departments to build an enterprisewide solution," said Ron Hankison, director of development for IBM's ImagePlus Systems business segment in Bethesda, Md.

Hankison, who spoke at the Imaging Expo '93 conference here, said IBM will begin delivering on its plan early next year.

IBM's imaging products were designed as four distinct offerings, a couple of them for specific users, Hankison said. The systems already can communicate on a basic, asynchronous level, but Hankison's goal is to provide synchronous connectivity for more widespread image access.

IBM, which has more than 1,200 imaging systems installed, is a leading player in the imaging market, thanks in large part to sales of its ImagePlus MVS/ESA and ImagePlus/400 host-based products. These products, which rely on IBM databases, are well suited to operational applications that require high transaction rates as opposed to ad hoc applications.

IBM plans to evolve these products into client/server systems to provide additional functionality to end users, according to Hankison. Currently, the MVS and Application System/400 products support OS/2 clients, but all of the application functionality runs at the host. IBM plans to move some application processing to the client, which now just handles presentation," he said.

"On the client, we're focusing on building a complete application that will support not just the capture, but indexing, retrieval, presentation and routing from one workbasket to another — more of the work management capabilities," Hankison said. "On the server, we would keep the data and the library about the data."

IBM also will revamp its RISC System/6000-based line of imaging products to let users implement the RS/6000 and other AIX-based servers in ImagePlus/2 local-area network imaging system installations, he said.

IBM will also look to open up its imaging systems to other vendors' computer operating systems and databases, he added. For example, IBM will support Windows and possibly Unix and Apple Computer, Inc. Macintosh clients, as well as Windows NT and various Unix servers.

IBM also early next year plans to support Transmission Control Protocol/Internet Protocol nets in its imaging products, which currently handle IBM communications protocols.

SynOptics

Continued from page 3

the Ethernet and token-ring management modules that can deliver traffic analysis and problem resolution information.

In conjunction with the 5000 rollout, SynOptics introduced a new version of its management software, Optivity 4.0, which provides virtual network capabilities and will be initially available on SunConnect's SunNet Manager. It allows net managers to group devices linked to the 5000, including those indirectly connected to other hubs, into logical groups.

If a user needs access to two servers on separate LANs in different buildings, for example, an adminisstator can logically assign that person to both LANs.

While generally enthusiastic, analysts said SynOptics needs to provide more details on its switching capabilities.

"SynOptics announced an architecture, a platform and a management approach, but it's missing some key modular pieces," said Todd Dagres, vice president of data communications at The Yankee Group, a Boston-based consulting firm. "They built the house, but the furniture hasn't been delivered."

The house provides a number of amenities for users. "The 5000 compares favorably to next-generation hubs under development," Dagres said. "[SynOptics] will be doing segment and port-level switching, which will also include token-ring switching. That will be important for users as they build high-speed nets."

©SynOptics: (408) 988-2400.

Rate

Continued from page 5

bill is $93.45 per month.

With the new plan, the customer pays by the minute for carrier common-line service, local switching and an interconnection charge premium. However, the customer pays a flat rate per line for an entrance facility, plus a flat rate per line and a per-mile charge for direct-trunked transport. The new bill totals $143.22, an increase of just over 50%.

The local exchange carriers' new rates are intended to be revenue neutral, but the changes will not affect users uniformly. The interim tariffs mean a slight decrease in rates for AT&T and a small hike for MCI Communications Corp. and Sprint Corp., plus a hard hit for the third-tier carriers and corporate users.

Switched transport refers to the facilities used to carry traffic between a long-distance carrier's or corporation's network point of presence (POP) and a local exchange carrier's central offices. The service provides an economical way to ferry calls between the local switched traffic such applications as credit card authorization via 950 access services.

For corporate users that want to avoid the increase by reconfiguring their nets, alternatives to switched transport include 800 service and WATS lines.

The new rates had their genesis in the Consent Decree attempt to promote competition among long-distance carriers by allowing all of them equal access to the local exchange carriers' networks. To that end, the Department of Justice required that all users of switched access charge the same fee per minute of use.

The approach led to higher volume users subsidizing lower volume users and some net inefficiencies. For example, because users were only paying for each minute of use, companies have left unused trunks in place rather than incur disconnection fees. The new switched access tariffs are intended to address both problems by raising rates for small users and adding monthly access charges, among other fees.

Although the changes have been in the works for a year, the announcement last month left some users scrambling to restructure networks in order to avoid higher bills. For example, heavy users of inbound calling may switch to 800 lines and those dependent on outbound calling may consider WATS lines.

Senior Editor Bob Wallace contributed to this story.

LOCAL NETWORKS

Banyan details StreetTalk, net control enhancements

Plans revealed at global user conference.

BY CHRISTINE BURNS

Ottawa

Banyan Systems, Inc. officials last week detailed a long list of product enhancements aimed at helping users better manage their Banyan networks and communicate with users on other systems.

At the Association of Banyan Users International conference here, Banyan laid out plans to enhance its StreetTalk III directory services, support the industry-standard Simple Network Management Protocol and tightly integrate Apple Computer, Inc. Macintoshes into enterprise networks supported by Banyan's Enterprise Network Services (ENS) software.

StreetTalk III, the latest release of Banyan's enterprise naming service, has been lauded by users for its easy-to-use naming structure. Any node address on the net is identified by a string of three attributes. StreetTalk III stores additional attributes about individual users — such as job titles, skill sets and physical descriptions — on a StreetTalk server database.

X.500 support will be announced within the next 12 to 18 months, Burke said.

StreetTalk III will be enhanced to make it easier to search the directory for a user. Currently, users can only conduct a search if they know one or more of the three basic attributes. But Barry Burke, director of enterprise applications, said that in future versions of StreetTalk III, users will be able to search by querying any of the attributes stored in the database.

He added that this capability will become increasingly important to users as Banyan begins to integrate X.500 technologies with StreetTalk. X.500 is a CCITT standard that aids in integrating directories. Burke said he expects X.500 support for StreetTalk to be announced within the next 12 to 18 months.

FAIL-SAFE LOGON

Another feature to be added to StreetTalk is a fail-safe logon capability that lets a user log on to a second server if a primary server is down. Security features of either VINES or ENS would be adjusted to ensure that a user is not logged on to both simultaneously.

"Not having that right now is a problem. With the current setup, if your server is down, you're completely shut out from the network," said Doug Wellsby, a network manager with the Canadian Department of Defense. However, he added that keeping track of two logons for every user on a large net may be difficult.

MANAGEMENT MOVES

While Banyan is moving to increase the services it offers on the VINES and ENS platforms, officials said the company will also make those services more manageable for enterprise users.

Robert Garvey, Banyan's product-line manager of network management, said the firm will base all future management support within its product line on SNMP Version 2.0.

SNMP is an industry-standard protocol that governs network management and monitoring of network devices. SNMP 2.0 is an improvement over its predecessor because it offers users more secure communications and faster collection of management data.

Banyan is taking a different approach to integrating SNMP into VINES and ENS. SNMP management capabilities will be imbedded directly into Banyan's StreetTalk III, Intelligent Messaging and security services.

That approach will allow for easy expansion of enterprise networks because the management capabilities come along with the services, which can be managed from any console that supports SNMP, Garvey said.

Banyan officials also announced Electronic Data Distribution (EDD), which lets a systems administrator download applications, software updates and reports from servers to workstations.

Since EDD will run on native VINES, ENS for NetWare and VINES for Unix line, software distribution can be handled across multiple network operating systems. EDD will be available for all Banyan platforms during the first half of next year.

APPLE TALKING

During a technical session outlining ENS support for Macintosh clients, Banyan officials spoke about future support for Apple Open Collaborative Environment (AOCE).

AOCE integrates network services, such as a single logon feature, a catalog browser and the ability to send electronic mail from any application running on a Macintosh machine.

While ENS offers users transparent access to resources on the network, AOCE provides a user-friendly interface.

By integrating AOCE into ENS, a Macintosh user can log on and access resources in a Banyan network. For example, Banyan's StreetTalk III directory services will be available through the AOCE catalog interface.

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Circle Reader Service #40

Memorex Telex improves LAN mainframe links

BY MICHAEL COONEY

Raleigh, N.C.

Memorex Telex last week rolled out a family of communications products designed to help users more efficiently link local-area networks to mainframes.

The Memorex Telex 9400 Enterprise Communications family consists of three products: the 9432 Enterprise Gateway for attaching LANs to mainframes; the 9420 Communications Server; and the 9460 Internetworking Communication Subsystem, a communications off-load facility for Memorex Telex superservers.

"We are positioning our 9400 series to help users connect client/server or LAN environments with existing legacy applications," said Jay Morrison, director of marketing for Memorex Telex's Networks Group.

The 9432 is the firm's latest product for attaching LANs to mainframe channels, replacing the Model 9430, which Memorex Telex announced last year.

Based on an Intel Corp. 66-MHz 80486 processor with 64M bytes of system memory, the 9432 runs a customized version of Novell, Inc.'s NetWare for SAA Gateway software along with Memorex Telex-developed NetWare Loadable Modules (NLM) that give it a variety of features.

The 9432's eight slots can support any mix of token-ring, Ethernet and Fiber Distributed Data Interface LAN connections, as well as V.35 and RISC System/232 or RS/422 ports for wide-area Synchronous Data Link Control lines. The box can communicate with four mainframes and support leased-line speeds from 56K bit/sec to T-1. The older 9430, in contrast, supports five communications slots, 16M bytes of memory and access to two mainframes.

The 9432 supports bridging and routing via Novell's NetWare MultiProtocol Router (MPR) NLM, along with Transmission Control Protocol/Internet Protocol Downstream Physical Unit (DSPU) NLMs developed by Memorex Telex. The TN3270 NLM lets 3270 devices access Systems Network Architecture applications on an SNA mainframe over a TCP/IP net, while DSPU support lets SNA traffic flow over token-ring, Ethernet or FDDI LANs.

"By supporting SNA and TCP/IP right on the gateway, users don't need to mess around with routers because the traffic can be passed directly to the mainframe," said David Passmore, vice president and service director at Gartner Group, Inc., a Stamford, Conn., consultancy.

The 9432 is available now starting at $28,500.

The 9420 Communications Server is designed as a remote office feeder node to the 9432 or Memorex Telex's 86XX LAN superservers. Based on the same basic hardware as the 9432, it supports as many as four token-ring, Ethernet or FDDI LAN connections locally and four 56K bit/sec Synchronous Data Link Control, four 64K bit/sec X.25 or one T-1 link.

The 9420 also supports the Novell MPR as well as Novell's Branch Office Solution, which provides all the software components to set up a small branch office, such as a five-user version of NetWare.

The 9240 will be available in the fourth quarter. Pricing has not been set.

Memorex Telex's 9460 Internetworking Communication Subsystem supports token-ring, Ethernet and FDDI attachments, and connects to Memorex Telex's 86XX superservers via a Small Computer System Interface. The 9460 off-loads communications tasks from the superserver, freeing up CPU power.

It will be available in November for $20,500.

✆Memorex Telex: (919) 250-6100.

Apple's new PowerTalk strengthens Mac messaging

BY PETER LISKER

Cupertino, Calif.

Apple Computer, Inc.'s AppleSoft division will introduce today a dramatically enhanced version of the Macintosh System 7 Pro operating system that incorporates messaging functions into the Apple Finder.

PowerTalk, a communications application bundled with System 7 Pro, is the first offering in the Apple Open Collaboration Environment (AOCE) and is fully integrated in the Macintosh system software.

"System 7 Pro is a clear indication of how serious Apple is about integrating collaborative services into the Macintosh framework," said David Nagel, senior vice president and general manager of AppleSoft.

The Finder-enabled messaging system will work with server software — the not-yet-released PowerShare Collaboration Servers — to allow users to take advantage of server-based store-and-forward messaging, centralized management of mail and network catalogs and public-key based security services.

In addition, PowerShare-enabled applications, which will call on an Apple PowerShare application program interface, will maintain local-area network-based directories that individual PowerTalk users will be able to access and utilize.

PowerTalk supports messaging services that include facsimile, voice mail and electronic mail. The application is bundled with AppleMail, a letter application that allows PowerTalk users to exchange documents with other PowerTalk users.

"We believe that PowerTalk will enable an entirely new class of users to engage in the productivity enhancing environment of electronic messaging," said Gursharan Sidhu, AppleSoft's director of collaboration products and chief architect of AOCE.

Macintosh users have traditionally been on the leading edge of computer technologies, and PowerTalk is the first of a suite of applications designed to bring collaborative processing to the Macintosh environment. The PowerShare Collaboration Servers product, scheduled to be available in early 1994, will add work flow and work group support to the Macintosh environment.

As part of the Apple introduction, Milpitas, Calif.-based Octel Communications Corp. will demonstrate its Visual Voice and Fax Messaging application, an example of the kinds of applications that will be built using PowerTalk. With the Octel system, users will be able to visually manage both their telephones and Octel voice processing mailboxes from a Macintosh desktop through pull-down menus and dialogue boxes.

"PowerTalk will be an important technology for users in that it will eventually integrate all messaging functions and make them accessible from a single desktop icon," said Dan Nanneman, group product manager for Octel.

✆Apple: (408) 996-1010.

IBM hubs

Continued from page 1

hub will at least double the current capacity of IBM's biggest 8250, while the low-end model will be a three-slot feeder node, with each slot supporting a single-port module. Existing six- and 17-slot 8250s will also work with the new enterprise hub.

IBM said the new hubs will continue to utilize ChipCom ONline System Concentrator hub technology but include far more IBM-built technology than current 8250s. For example, they will support modular versions of IBM's 3174 Establishment Controller and 6611 router plus IBM ATM and wireless LAN modules.

The 6611 module will let users route LAN data onto a multiprotocol backbone as well as terminate Synchronous Data Link Control traffic and convert it to a LAN-compatible format. With the 3174 module, users will be able to attach 3270 devices directly to the hub.

IBM's ATM module will support workstations outfitted with the ATM adapters the company announced in July, which will operate at speeds of at least 25M bit/sec over shielded or unshielded twisted pair (*NW,* July 19, page 1). No details were presented on the wireless LAN modules.

To provide new management options, IBM said it would give NetView the ability to control the 8250, whereas it can only monitor it today. IBM's NetView/6000, a Simple Network Management Protocol platform, and the departmental LAN NetView manager control the 8250 now.

"IBM is building a magnificent beast with this new hub. It should be beneficial to a lot of users looking to consolidate multiple functions on one box," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C.

PUMPING UP TCP/IP

Moving up to the mainframe arena, IBM said its next release of MVS/ESA, Version 4 Release 4, will contain a major upgrade of TCP/IP for MVS. The upgrade was originally scheduled to be announced this summer for availability by November, but it will now be announced early next year and ship around June of 1994, said Bill Cassidy, a senior programmer with IBM.

"There are over 170 items that we'll be adding to this release, and it's taking more time to implement them than we originally thought," Cassidy said.

NEW FEATURES

New features include a TCP/IP Sockets interface to the IMS database, an IBM database management platform used primarily for high-speed on-line transaction processing applications.

Cassidy said IBM will also include modifications to let mainframe TCP/IP applications more easily add, delete or update DB2 database files.

The new release will improve TCP/IP File Transfer Protocol support, adding features such as data compression and the ability to perform checkpoint restarts so whole files will not have to be resent in the event of a transmission failure.

The software will also include support for the Internet Engineering Task Force's Request For Comment 1006, which describes how to access Open Systems Interconnection applications over a TCP/IP net.

"That feature will be of interest to users who want to use X.400 or X.500 messaging or electronic mail applications," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "These are popular applications in the OSI world that would be useful to support in a TCP/IP network."

IBM is also planning a new version of its 3172 Offload Program, which moves TCP/IP protocol processing off the mainframe and onto the 3172 controller. The company is working on a version of the software that will run on an AIX-based RISC System/6000. That should improve its performance vs. the current version, which runs under OS/2 on an Intel 80486-based 3172.

"Improving performance is our single biggest issue with the TCP/IP product line, and the RS/6000 is one of the fastest boxes around," Cassidy said.

Cassidy said IBM is working with thir party vendors to offer additional TCP/I facilities, such as a version of the TCP/IP off-load software for BusTech, Inc.'s BT-1. The BT-1 is a 3172 that BusTech resells with software tailored for attaching Novell, Inc. NetWare LANs to mainframes.

Users at the conference were impressed with the additional TCP/IP for MVS features but worried about delivery dates.

"We want the improved performance they are promising with TCP/IP," said one user who requested anonymity. "The faster off-load platforms are also something we have been waiting for. I just hope we don't have to wait too long."

NetWare

Continued from page 3

The new Microsoft Mail Driver eliminates the need for a gateway and will let the customer directly access NetWare Global MHS and its features. The optional NetWare Global MHS 2.0 enhancement will be available free of charge on NetWire by the end of this month.

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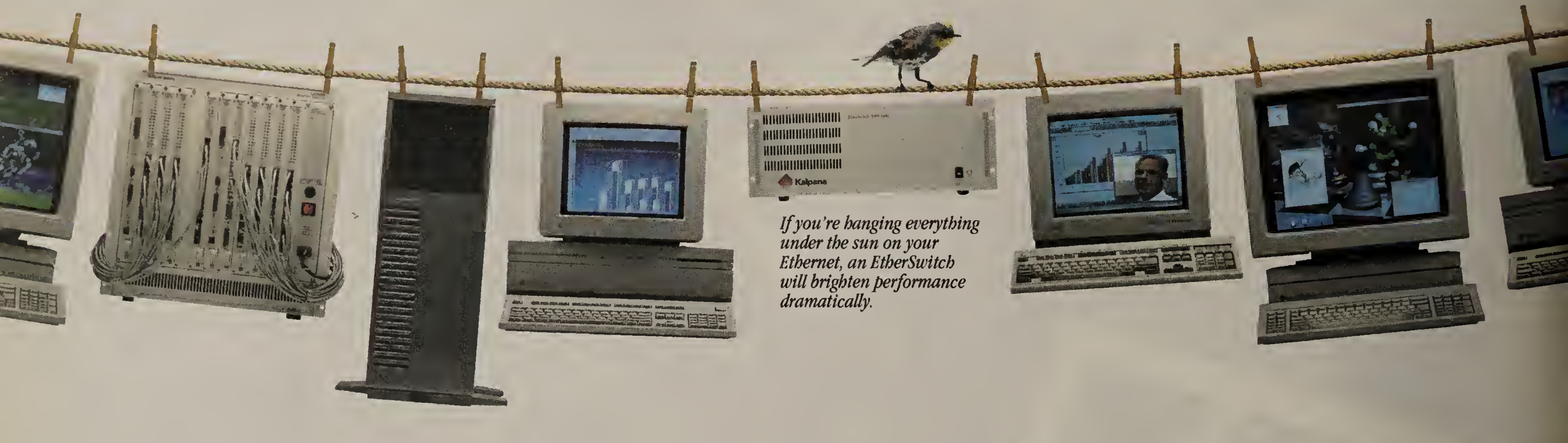
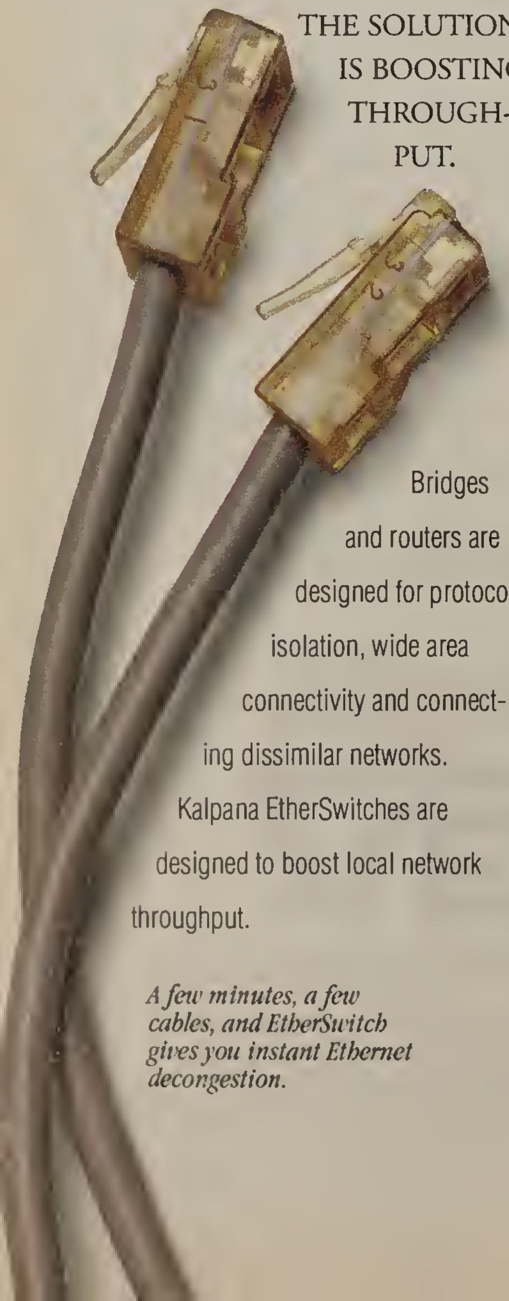

If you're hanging everything under the sun on your Ethernet, an EtherSwitch will brighten performance dramatically.

Things got ugly six months ago when simple CAD drawings took five minutes to download. Now they're taking ten.

New, monster applications. Multimedia. High-speed servers. High-volume transfers between floors and buildings. They've got your network backbone sagging, timeouts multiplying, and response times down to a crawl.

IF THE PROBLEM IS CONGESTION, THE SOLUTION IS BOOSTING THROUGHPUT.



Bridges and routers are designed for protocol isolation, wide area connectivity and connecting dissimilar networks. Kalpana EtherSwitches are designed to boost local network throughput.

A few minutes, a few cables, and EtherSwitch gives you instant Ethernet decongestion.

When you're fighting overloaded local connections, you need to switch.

ETHERSWITCH® IMMEDIATELY ACCELERATES THROUGHPUT BY AS MUCH AS 600%.

Instead of sending single packets one at a time, the EtherSwitch works like a telephone PBX, sending several packets at once on parallel paths.

Suddenly a 10Mbit/s network becomes effectively a 70 Mbit/s network. Peak loads are eliminated and every user gets all the bandwidth they need. All the time.

Those CAD drawings take seconds. Building-to-building conversations happen instantly. Collisions are drastically reduced.

And you don't have to tear anything apart to do it. You just plug in a Kalpana EtherSwitch. It takes five, maybe ten minutes. And it could add that many years to the life of your current network structure.

You don't have to destroy your existing network structure just to get faster response times.

SIMPLER IS ALWAYS SMARTER.

Installing and maintaining a router is no small item.

Installing and maintaining an EtherSwitch is a small item.

Unlike routers, an EtherSwitch is truly a plug-and-play solution. There's no software to install or maintain. They're protocol independent. And they automatically recognize all the different equipment on your network.

Nothing has to be redesigned, reconfigured, re-routed or re-educated, including your users.

And unlike a router, a Kalpana EtherSwitch doesn't need a crew of people with extensive training to maintain it.

Which is very smart, when you think about it.

ETHERSWITCH IS SIMPLY LESS EXPENSIVE.

About half as much as a router, box-to-box. Plus installation,overhead and re-configuration time for the router, which is considerable, even if you don't count training.

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Instead of waiting for ATM or starting over with FDDI, EtherSwitch gives you the speed you want now with the network structure you already have in place. For a fraction of the cost. You solve your performance problems and put switching technology in place that has a future with ATM.

One of The Corporate Computing 50 BEST BUYS for 1993

The EtherSwitch family includes the five-port EPS-500 and the fifteen-port EPS-1500.

Call Kalpana at **800-488-0775** or 408-749-1600 for a Try'n Buy evaluation unit. Return it within 14 days if you're not completely happy. We'd also be happy to send you a white paper, "How an Ethernet Switch and Multiport Router Compare," or an animated disk that explains Ethernet switching.

So when is a simple switch a smarter choice? Now.

Kalpana
The EtherSwitch Company

Circle Reader Service #37

EtherSwitch is a registered trademark of Kalpana Inc.

ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

BRIEFS

Rabbit Software Corp. and **Tangram Systems Corp.** have announced plans to merge in a stock transaction. The resultant company, renamed **Tangram Enterprise Solutions, Inc.**, will be headquartered in Raleigh, N.C. Chris Jesse, chief executive officer of Tangram Systems, will become CEO of the new organization, and Charles Root, CEO of Rabbit Software, will become chairman of the board.

Rabbit Software provides software that lets personal computers and workstations connect to IBM mainframes. Tangram Systems develops file-transfer and software distribution products for workstations, local-area networks and IBM mainframes. The merger has been approved by both companies' shareholders.

CrossComm Corp. has announced a midrange version of its high-end multiprotocol router that is intended to provide the reliability needed to support mission-critical Systems Network Architecture applications.

With the exception of the number of interfaces supported, the ILAN XL20 is identical in features and functions to the top-of-the-line ILAN XL80 (*NW,* May 10, page 1). Each of the router's two slots support any combination of four token-ring or Ethernet local-area networks or six wide-area interfaces, thereby enabling the entire router to support a total of eight LAN or 12 wide-area network ports up to T-1 speeds.

The XL20 is available now and costs $4,950 for the base unit. Pricing for the router modules starts at $9,400.

CrossComm: (508) 481-4060.

FEL Computing will annouce at NetWorld 93 Dallas a gateway that links local-area networks to Transmission Control Protocol/Internet Protocol or Unix hosts. The LANlink-TCP gateway is software that runs on a dedicated personal computer. It supports Novell, Inc. NetWare, Banyan Systems, Inc. VINES, Microsoft Corp. LAN Manager, IBM LAN Server and Artisoft, Inc. LANtastic LANs. LANlink-TCP can support up to 100 sessions and provides access to TCP/IP hosts via the Telnet protocol and File Transfer Protocol. LANlink-TCP will ship in early October. Pricing starts at $1,495.

FEL Computing: (800) 639-4110.

Ascom Timeplex, Inc. has announced an agreement with **Vidicom,** a division of L.D. Bevan Company, Inc., to manufacture, sell and service Vidicom videoconferencing equipment. The videoconferencing systems can run over an Ascom Timeplex Link multiplexer network as well as other publicly accessible nets.

The Wollongong Group has announced the release of Pathway Management Station 3.1, a new version of the company's Simple Network Management Protocol-based net management system. Version 3.1 supports SNMP Version 2, which includes enhanced security, bulk data transfer and manager-to-manager communications capabilities. The new release will be available within 90 days and will cost $10,000.

Lines blur between IBM controllers

Improved features across the board cloud distinctions between offerings.

BY MICHAEL COONEY

Raleigh, N.C.

In the battle for the minds, hearts and pocketbooks of SNA users, nowhere is the contention more strong than in the controller arena — and nowhere is vendor strategy less clear.

Long the linchpins of hierarchical Systems Network Architecture networks, IBM 3745 Communications Controllers and 3174 Establishment Controllers, as well as third-party plug compatibles, have had to adapt to become more functional in the local-area network world. Additionally, the advent of devices such as IBM's 3172 Interconnect Controller, designed to attach LANs to mainframes, has helped blur the distinctions between controller lines.

"The overlap in IBM's controller line has become quite extensive, and it is no longer clear to the user which box they should use," said Atul Kapoor, principal at Kaptronix, Inc., a consultancy in Haworth, N.J. "What is clear in the controller arena is that IBM has lost the remote front-end processor market to the router, SDLC conversion device and bridge vendors of the world."

Synchronous Data Link Control conversion devices, such as those from Sync Research and NetLink, Inc., convert SDLC data into the LAN-compatible Logical Link Control 2 format, obviating the need to upgrade or replace older 3174s to make them LAN-attachable. They can play a pivotal role when used in conjunction with other IBM controllers.

For example, at a host site, users can install a LAN-attached SDLC converter to terminate SDLC lines for thousands of dollars less than a 3745 can perform the same function. To get the data to the mainframe, users can then employ a 3172, which attaches LANs to mainframe channels.

LORRAIN

Admittedly, users would lose a number of SNA functions performed by the FEP, such as subarea routing and transmission group capabilities. But IBM's plan to add APPN function to the 3172 would seem to address many of those issues by giving the 3172 full routing capabilities (*NW,* Aug. 2, page 1).

"It will become possible for users, as they move to APPN networks, to replace the concept of distributed 3745s with distributed APPN Network Nodes," said Jean Lorrain, a senior member of IBM's technical staff. "But it is expected that the migration period for general deployment will take a significant amount of time."

IBM doesn't recommend SDLC conversion devices for SNA users.

"While those converters can cut costs by improving communication line utilization, much greater savings can be gained by replacing obsolete 3274s or older Model 3174s with full function 3174s," said George Mills, product planning manager for the 3174. "Customers moving from hierarchical SNA networks to flat multiprotocol networks would gain much more by replacing obsolete equipment instead of delaying that replacement by installing what is basically a temporary solution."

According to Mills, the conversion devices don't yet support strategic features such as Advanced Peer-to-Peer Networking and Transmission Control Protocol/Internet Protocol, so users employing the devices

See Controllers, *page 21*

DECNET

DEC users delay move to DECnet/OSI

BY JIM DUFFY

DECnet users in the U.S. are postponing migration to DECnet/OSI but achieving many of the benefits it promises, mainly through increased use of TCP/IP in multivendor environments.

Large Digital Equipment Corp. DECnet shops need DECnet/OSI because, as they expand their networks, they are bumping into addressing limitations. DECnet Phase IV has a 16-bit address and supports 64,000 nodes, while DECnet/OSI supports 20-octet addresses and millions of nodes.

These users also require interoperability with non-DEC systems as their networks expand. DECnet/OSI achieves this through support of Open Systems Interconnection protocols.

But given the ascendance of Transmission Control Protocol/Internet Protocol as the preeminent networking protocol for multivendor interoperability, DECnet users say the business case for moving to DECnet/OSI is less compelling. And besides providing interoperability, TCP/IP can relieve addressing constraints because, at 32 bits, its address space is twice that of DECnet Phase IV, meaning it can support exponentially more nodes.

"The environment that we work in today is much more multiprotocol-based than it is pure DECnet," said Linda Porter, chairman of the DECnet/OSI transition group at the National Aeronautic and Space Administration's Marshall Space Flight Center in Huntsville, Ala. "TCP/IP is the major protocol in use in NASA networks today."

As a result, NASA's DECnet/OSI deployment is on hold in favor of TCP/IP implementation, Porter said.

Though DEC officials maintain that DECnet/OSI implementation is robust overseas, they acknowledge that TCP/IP is now more strategic to users in the U.S. than either DECnet or OSI. Indeed, DEC's interoperability strategy with such environments as IBM's SNA hinges on TCP/IP as the transport protocol, not DECnet (*NW,* Aug. 2, page 49). And other strategic endeavors, like DEC's foray into wireless networking, rely on TCP/IP instead of DECnet or OSI (*NW,* June 7, page 4).

So DEC's networking research and development dollars are going to TCP/IP and not to DECnet and OSI.

See DECnet, *page 21*

SNA gateway placement key to WAN bandwidth

BY MAUREEN MOLLOY

Like real estate, the key criteria in getting the best return on an SNA gateway investment are location, location and location.

Users that want to curtail the amount of extraneous data flowing over their wide-area network lines — and sharply reduce costs in the process — would be wise to confine Systems Network Architecture gateway devices to remote sites, according to Kevin Tolly, president of InterLAB, Inc., a Sea Girt, N.J.-based independent network testing laboratory and consultancy.

"Placement of the gateway can make or break your network strategy," he said. "Where you choose to put the gateway is as important as — if not more important than — what vendor's device you choose."

Rick McGee, director of networking systems architecture at IBM, agreed. "Gateways are a necessary evil, so [the user] needs to deploy them judiciously in order to make them more efficient," he said.

SNA gateways, which enable users to integrate personal computers and local-area networks into IBM SNA environments, look and behave remarkably

See Gateway, *page 18*

Announcing the first network printer

Operating System	*Topology*
Novell Netware	**Ethernet/802.3* *Token Ring (4/16 Mbps)*
Microsoft® LAN Manager	**802.3* *Token Ring (4/16Mbps)*
Windows for Workgroups	**802.3* *Token Ring (4/16 Mbps)*
Windows NT	**802.3* *Token Ring (4/16 Mbps)*
IBM LAN Server	**802.3* *Token Ring (4/16 Mbps)*
AppleTalk	**LocalTalk* **EtherTalk*
*HP-UX***	**Ethernet*
*SunOS***	**Ethernet*
*Solaris***	**Ethernet*
SCO UNIX®	**Ethernet*

*Standard in the HP LaserJet 4SI MX printer. **For operating HP-UX, SunOS or Solaris, a one-time purchase of $199 in configuration software is required. Adobe and PostScript are trademarks of Adobe Systems Inc. which may be registered in certain jurisdictions. Microsoft is a U.S. registered trademark of Microsoft Corporation. UNIX is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries. †In Canada call 1-800-387-3867, Ext. 7299. ©1993 Hewlett-Packard PE12353

Multiple environments are no longer worlds apart. Even if you have Novell Netware on one network, HP-UX on another and EtherTalk on a third, the new HP LaserJet 4Si MX printer easily connects across platforms. Automatically.

The HP LaserJet 4Si MX printer comes out-of-the-box preconfigured for multiple environments. There's nothing more to do than plug-and-play. All interfaces are simultaneously hot, making switching so seamless, end-users won't even notice.

What's more, HP's LaserJet 4Si MX printer is ready to handle whatever needs come down the

that adapts to multiple environments.

pike. More operating systems? No problem. As your network system continues to evolve, the capabilities of this printer are no longer just impressive. They're indispensable.

The HP LaserJet 4Si MX printer is loaded with features that define state-of-the-art. HP's enhanced PCL5 and genuine PostScript™ Level 2 software from Adobe™ come standard. Printer environments are saved while switching. Setup is a cinch with network software utilities and drivers included in the box. And, if you need any reassurance about trouble-free operation, you have it in our Simple Network Management Protocol (SNMP) support.

At 17 ppm, this is the fastest LaserJet ever, with I/Os and RISC-based formatter capabilities matched to support its speed. It delivers impeccable 600 dpi print quality—thanks to HP's microfine toner and Resolution Enhancement technology. Plus, it comes standard with two 500 sheet input trays.

But what if you don't need the full capabilities of the HP LaserJet 4Si MX printer right away? HP offers another printer that's probably a perfect fit. The HP LaserJet 4Si printer delivers the identical 17 ppm performance and superb 600 dpi print quality. It also has room to grow. The two MIO expansion slots let you add HP JetDirect network interface or third party cards. And you can add on Adobe's genuine PostScript Level 2 software and SIMM memory modules, as you need them.

To find out more about the multiple-network HP LaserJet 4Si MX printer and the upgradable HP LaserJet 4Si printer just call 1-800-LASERJET, Ext. 7299.†
Capabilities this advanced make a world of difference—in any environment.

HEWLETT
PACKARD

Circle Reader Service #33

Cayman preps integrated hub/router

BY MAUREEN MOLLOY

Cayman Systems, Inc. will announce at NetWorld 93 Dallas this week an integrated hub/router that will enable users to link work groups to corporate multiprotocol backbones.

With the GatorStar iHR, Cayman is aiming to shed its image as a vendor that focuses exclusively on Apple Computer, Inc. internetworking, said Mark Bannon, Cayman's vice president of sales, marketing and technical services. In addition to Macintosh work groups, the hub/router will support mixed Novell, Inc. NetWare, Windows and Unix work groups, enabling the vendor to extend its reach to the multiprotocol internet world.

The GatorStar iHR is a 24-port 10Base-T hub that is equipped with an additional attachment unit interface port that can support an Ethernet segment for users not utilizing 10Base-T connectivity.

The integrated two-port router supports Transmission Control Protocol/Internet Protocol, Novell's Internetwork Packet Exchange (IPX), AppleTalk and DECnet. The router will also support the encapsulation of IPX and AppleTalk data within TCP/IP packets, enabling users to link work groups across wide-area TCP/IP backbones.

GatorStar iHR also comes with two expansion slots, both of which can be used to support either wide-area links or LocalTalk interfaces. Depending on which expansion board is employed, the extra slot can support features including 64K bit/sec links, dial-up links of up to 28.8K bit/sec and data compression.

In addition, the hub/router's software and net configuration are stored in flash erasable programmable read-only memory, which enables users to download software reconfigurations and upgrades from a central site.

The device can be monitored from any Simple Network Management Protocol-based net management system as well as from any TCP/IP host via Telnet. Out-of-band communications are provided via one of the serial expansion slots.

For additional work group security, the GatorStar iHR features Cayman's own proprietary PortSentinel software that denies access to unauthorized users.

The GatorStar iHR will be available next month for $4,995. The LocalTalk and serial expansion cards will be available in January.

©Cayman: (617) 494-1999.

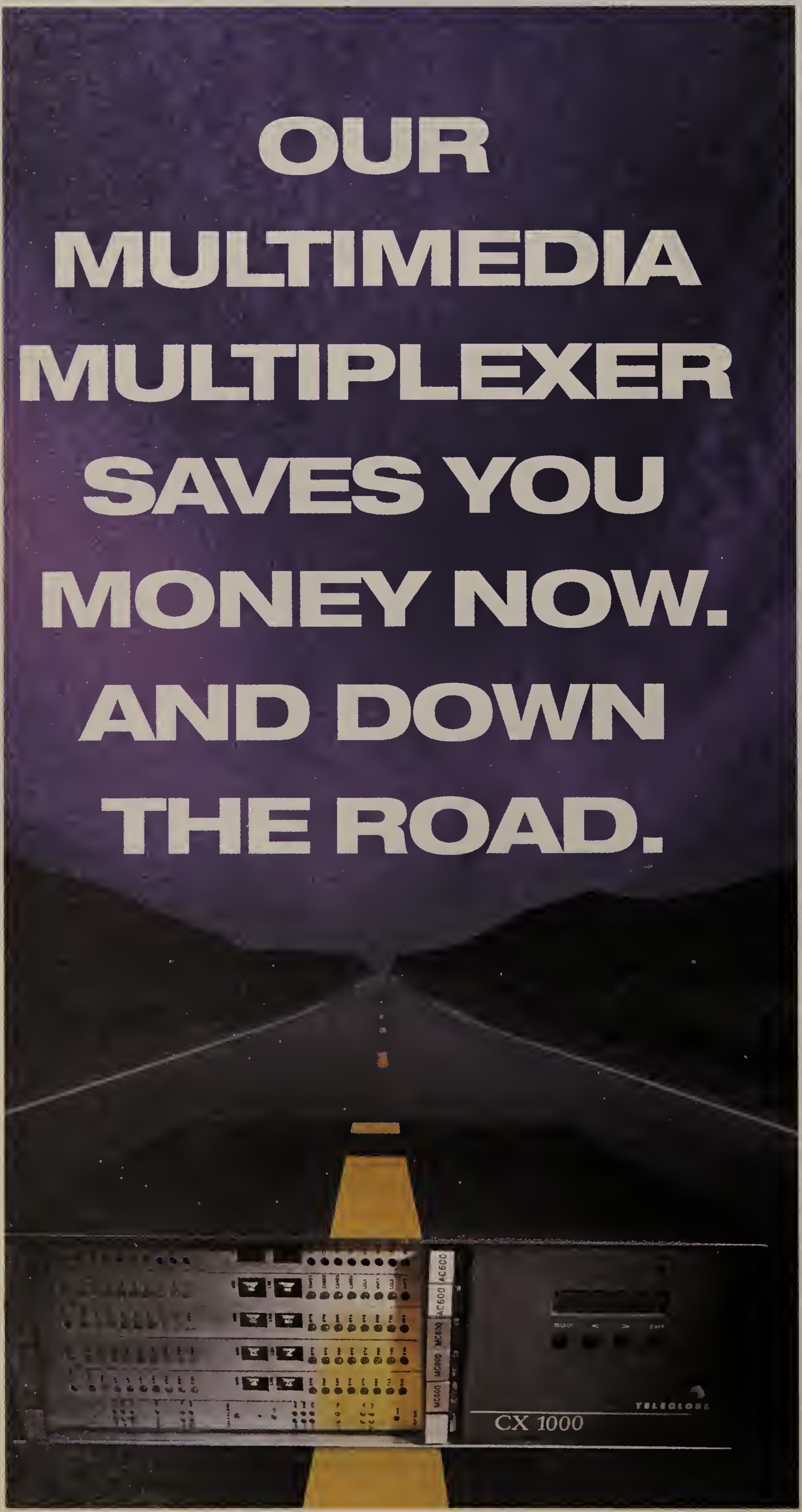
Cayman through the years

1987
GatorBox Classic
LocalTalk-to-Ethernet router

1989
GatorBox CS
LocalTalk-to-Ethernet router

1990
GatorStar GX
Ethernet-to-LocalTalk router/hub

1993
GatorStar iHR
Ethernet-to-Ethernet router/hub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TELEGLOBE
Communication Products

Circle Reader Service #24

McDATA boosts TCP/IP support for controller

BY MICHAEL COONEY

Broomfield, Colo.

McDATA Corp. last week added new features to its LinkMaster 7100 communications controller that will make it easier to design and configure TCP/IP and SNA nets.

The firm added support for the Transmission Control Protocol/Internet Protocol Telnet virtual terminal protocol and IBM's Dynamic Definition of Dependent Logical Units (DDDLU) feature, which will let users attach 3270 devices to a Systems Network Architecture net without having to take the net down.

The new TCP/IP Telnet client support feature is a software upgrade to the 7100's operating system. It lets 3270 and ASCII terminals attached to the 7100 controller communicate with TCP/IP applications on remote Unix or IBM hosts. The controller, which can reside on either a token-ring or Ethernet local-area network, supports as many as 220 Telnet sessions.

Users can mix and match up to five SNA or TCP/IP Telnet sessions from one terminal, said Loren Card, product manager for the 7100. For example, a 3270 user linked to the 7100 could have two sessions with a Unix host and three sessions with a IBM host simultaneously. Users can also hot-key between sessions.

The Telnet feature brings McDATA's box almost even with IBM's 3174 Establishment Controller, which supports 250 Telnet sessions. IBM, however, requires additional hardware and software to obtain Telnet support,

See McDATA, *page 18*

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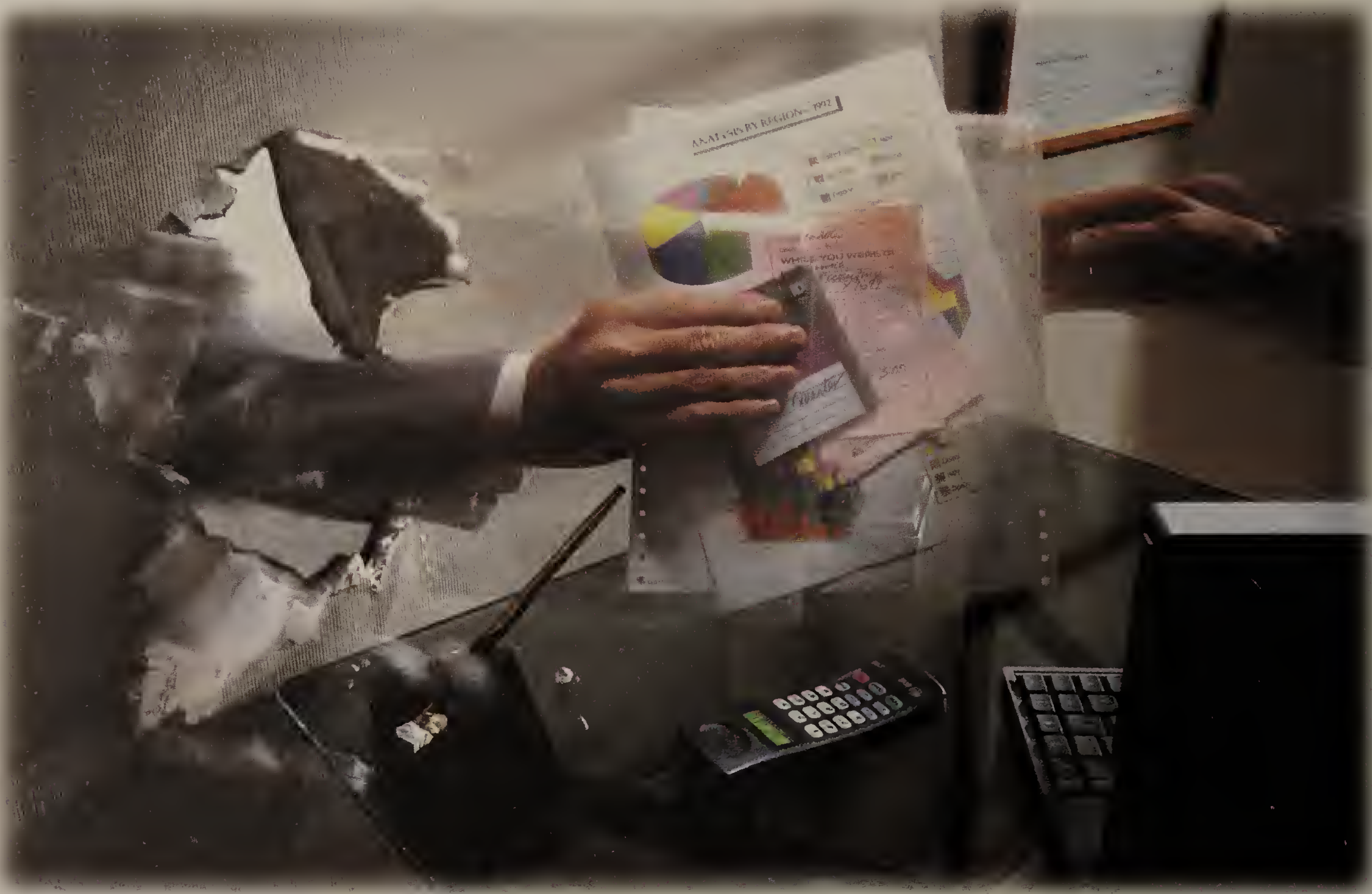

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1 Industry: (check one only)

01. ☐ Manufacturers (other than Computer/Communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04 ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
08. ☐ Retail/Wholesale Trade/Business Services
09. ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
13. ☐ Government, State/Local
14. ☐ Government, Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/VAN/ Systems Houses
22. ☐ Distributors, Computer Related
23. ☐ Distributors, Communications Related
24. ☐ Other________________________________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt.
2. ☐ LAN Mgmt.
3. ☐ Datacom/Telecom Mgmt.
4. ☐ Engineering Mgmt.

MIS MANAGEMENT
5. ☐ MIS, IS, IT Mgmt.
6. ☐ Engineering Mgmt.

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)
8. ☐ Consultant (Independent)
9. ☐ Other________________________________

3 My responsibilities include: (check one only)

1. ☐ LANs/ Internetworking/ WANs
2. ☐ LANs/ Internetworking
3. ☐ LANs
4. ☐ WANs
5. ☐ None

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9.
6. ☐ 1
7. ☐ None

5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. Scope
(check one only)
1. ☐ Corporatewide
2. ☐ Multienterprise (consultants)
3. ☐ Departmental

B. Involvement
(check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate

4. ☐ None (A or B)

6 Check all that apply in Columns A and B:

A. I am involved in the purchase of the following products/services.
B I plan to purchase the following products/services in the next year.

Involved / Plan to Purchase

A B **LOCAL-AREA NETWORKS**
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ LAN Servers
☐ 03. ☐ LAN Operating Systems Software
☐ 04. ☐ Superservers
☐ 05. ☐ Data Base Servers (Oracle, Sybase, etc).
☐ 06. ☐ Terminal Servers
☐ 07. ☐ LAN Services
☐ 08. ☐ LAN Storage Devices (optical, tape, disk, etc,. including backup systems)
☐ 09. ☐ Network Test Equipment
☐ 10. ☐ Hubs
☐ 11. ☐ Cables, Connectors, Baluns
☐ 12. ☐ UPS
☐ 13. ☐ Network Adapter Boards
☐ 14. ☐ Peer-to-Peer LANs
☐ 15. ☐ Wireless LANs
☐ 16. ☐ SNMP Network Management
☐ 17. ☐ ATM (Asynchronous Transfer Mode)

A B **INTERNETWORKING**
☐ 18. ☐ Bridges
☐ 19. ☐ Routers
☐ 20. ☐ Gateways
☐ 21 ☐ Bridge/Routers
☐ 22. ☐ Hubs
☐ 23. ☐ Intelligent Hubs
☐ 24. ☐ Communications Servers

Involved / Plan to Purchase

A B **COMPUTERS/PERIPHERALS**
☐ 25. ☐ Micros/PCs
☐ 26. ☐ Minis
☐ 27. ☐ Mainframes
☐ 28. ☐ Pen-Based
☐ 29. ☐ Laptops
☐ 30. ☐ Workstations
☐ 31. ☐ Image Processing Workstations
☐ 32. ☐ Front-End Processors
☐ 33. ☐ Terminals
☐ 34. ☐ Printers
☐ 35. ☐ Cluster Controllers
☐ 36. ☐ Fax Machines
☐ 37. ☐ X-Terminals

A B **SOFTWARE/APPLICATIONS**
☐ 38. ☐ Network Management
☐ 39. ☐ Micro to Mainframe
☐ 40. ☐ Security
☐ 41. ☐ Communication/Terminal Emulation
☐ 42. ☐ Word Processing
☐ 43. ☐ Operating Systems
☐ 44. ☐ Business Applications (Finance/Mfg/HR)
☐ 45. ☐ Applications Development
☐ 46. ☐ Data Base Management
☐ 47. ☐ Spreadsheet
☐ 48. ☐ Groupware
☐ 49. ☐ EDI
☐ 50. ☐ E-Mail
☐ 51. ☐ Windows/Graphical User Interface
☐ 52. ☐ 4GL/Development
☐ 53. ☐ Multimedia
☐ 54. ☐ Graphics
☐ 55. ☐ Utilities

A B **WIDE-AREA NETWORK EQUIPMENT/SERVICES**
☐ 56. ☐ Modems (9.6K bps and over)
☐ 57. ☐ Modems (under 9.6K bps)
☐ 58. ☐ T-1
☐ 59. ☐ T-3
☐ 60. ☐ Fractional T-1
☐ 61. ☐ Data Switches
☐ 62. ☐ SMDS
☐ 63. ☐ ATM (Asynchronous Transfer Mode)
☐ 64. ☐ Matrix Switches
☐ 65. ☐ Packet Switches
☐ 66. ☐ Protocol Converters
☐ 67. ☐ Diagnostic/Test Equipment
☐ 68. ☐ DSU/CSUs
☐ 69. ☐ Microwave
☐ 70. ☐ Fax Boards/Modems
☐ 71. ☐ VSAT
☐ 72. ☐ Fiber Optic
☐ 73. ☐ Satellite
☐ 74. ☐ ISDN
☐ 75. ☐ PBXs (over 1000 lines)
☐ 76. ☐ PBXs (under 1000 lines)
☐ 77. ☐ Automatic Call Distributors
☐ 78. ☐ Voice Messaging Systems
☐ 79. ☐ Videoconferencing Systems
☐ 80. ☐ Voice Response/Processing
☐ 81. ☐ Switched Voice
☐ 82. ☐ Dedicated Leased Line
☐ 83. ☐ Switched Data
☐ 84. ☐ Centrex
☐ 85. ☐ E-Mail/On-Line Information
☐ 86. ☐ Image Processing
☐ 87. ☐ Audio Teleconferencing
☐ 88. ☐ Local Services
☐ 89. ☐ WATS MTs
☐ 90. ☐ International
☐ 91. ☐ Virtual Networks
☐ 92. ☐ Frame Relay
☐ 93. ☐ Value Added Services
☐ XX ☐ None of the above (1-93)

7 What is the total number of A: LANs B: Workstations/Nodes in your entire organization?

	LANs A		Workstations/ Nodes B
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	9 or Less	☐

8 Which of the following network platforms are currently installed/planned in the next year?

NETWORK ARCHITECTURES
Present Planned
☐ 01. ☐ SNA
☐ 02. ☐ DECNET
☐ 03. ☐ MAP/TOP
☐ 04. ☐ TCP/IP
☐ 05. ☐ DCA (Unisys)
☐ 06. ☐ X.25

Present Planned
☐ 07. ☐ NOVELL IPX/SPX
☐ 08. ☐ APPC/APPN/LU 6.2
☐ 09. ☐ NETBIOS
☐ 10. ☐ OSI
☐ 11. ☐ APPLETALK
☐ 12. ☐ OTHER________________________

LAN OPERATING SYSTEM
☐ 13. ☐ LOCALTALK (APPLETALK)
☐ 14. ☐ BANYAN (VINES)
☐ 15. ☐ DCA (IRMALAN)
☐ 16. ☐ DCA (10-NET)
☐ 17. ☐ IBM (LAN SERVER)
☐ 18. ☐ IBM (PC LAN PROGRAM)
☐ 19. ☐ MICROSOFT (LAN MANAGER)
☐ 20. ☐ UNGERMANN-BASS (NET/1)
☐ 21. ☐ NOVELL (NETWARE, 2.X, 3.X, 4.X)
☐ 22. ☐ PROTEON (PRONET)
☐ 23. ☐ SITKA (TOPS)
☐ 24. ☐ 3COM (3+, 3+OPEN)
☐ 25. ☐ ARTISOFT (LANTASTIC)
☐ 26. ☐ HAYES (LANSTEP)
☐ 27. ☐ DEC (PATHWORKS)
☐ 28. ☐ OTHER________________________

LAN ENVIRONMENT
☐ 29. ☐ 4M TOKEN RING
☐ 30. ☐ 16M TOKEN RING
☐ 31. ☐ ARCNET
☐ 32. ☐ ETHERNET
☐ 33. ☐ STARLAN
☐ 34. ☐ FDDI
☐ 35. ☐ LOCALTALK
☐ 36. ☐ 10BASE-T
☐ 37. ☐ OTHER________________________

OPERATING SYSTEM
☐ 38. ☐ DOS
☐ 39. ☐ UNIX/XENIX/AIX
☐ 40. ☐ OS/2
☐ 41. ☐ OS/2 2.X
☐ 42. ☐ MVS
☐ 43. ☐ VM
☐ 44. ☐ VMS
☐ 45. ☐ MACINTOSH
☐ 46. ☐ WINDOWS
N/A 47. ☐ WINDOWS NT
☐ 48. ☐ X WINDOWS
☐ 49. ☐ OTHER________________________

9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes Currently Installed	Planned Next Year	Minis Currently Installed	Planned Next Year
01. DEC	☐	☐	☐	☐
02. IBM	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER____________	☐	☐	☐	☐

MICROCOMPUTERS
(fill in the numbers)

	NUMBER INSTALLED	NUMBER PLANNED NEXT YEAR
11. MACINTOSH 20, 30, 40		
12. MACINTOSH OTHER		
13. PCs BASED ON 80586	N/A	
14. PCs BASED ON 80486		
15. PCs BASED ON 80386		
16. PCs BASED ON 80286		
17. PCs BASED ON 8086/8088		
18. RISC / UNIX BASED WKSTNS		
19. OTHER		

11 Estimated value of networking equipment and services:

A. Which you helped specify, recommended or approved in the last year?
B. Which you plan to help specify, recommend or approve in the next year?

A B
☐ 1. ☐ $100 million and over
☐ 2. ☐ $50 - $99.9 million
☐ 3. ☐ $25 - $49.9 million
☐ 4. ☐ $20 - $24.9 million
☐ 5. ☐ $10 - $19.9 million
☐ 6. ☐ $5 - $9.9 million
☐ 7. ☐ $1 - $4.9 million
☐ 8. ☐ $500,000 - $999,999
☐ 9. ☐ $499,999 or less

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ Over $10 billion
2. ☐ $1 to $9.9 billion
3. ☐ $500 to $999.9 million
4. ☐ $100 to $499.9 million
5. ☐ $50 to $99.9 million
6. ☐ $10 to $49.9 million
7. ☐ $5 to $9.9 million
8. ☐ $4.9 million or less

13 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

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Gateway

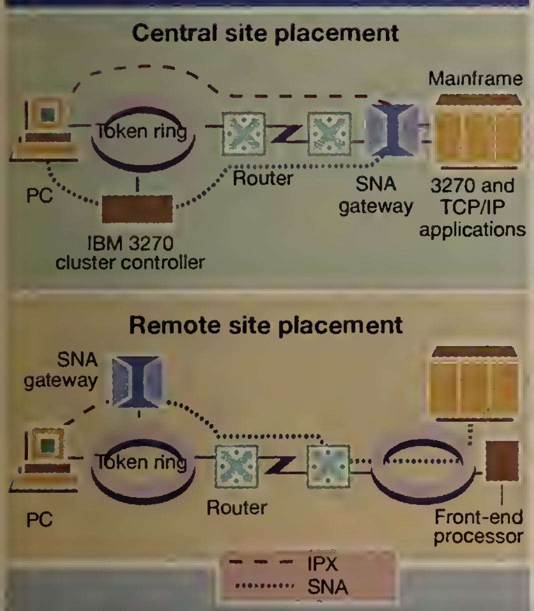
Continued from page 12

similar from an end-user point of view. That is, they let a LAN-attached PC client gain access to an SNA host by translating data into SNA-compatible formats.

But differences in performance crop up depending on the protocols being supported as well as the physical location of the gateway, Tolly said. Gateways supporting overhead-intensive protocols such as Novell, Inc.'s Internetwork Packet Exchange (IPX) and IBM Network Basic I/O Systems fared significantly better when they were placed in a remote site, according to test results of SNA gateway devices conducted by InterLAB.

Novell's NetWare for SAA gateway, for instance, produces as much as seven times more overhead than a PC running its own SNA stack and using the Logical Link Control 2 protocol for transport. That is because the gateway introduces its own proprietary protocol, putting the LAN data in a bigger, less efficient envelope than native SNA.

Getting the most from SNA gateways



Users can prevent overhead-intensive data such as IPX from traversing a WAN link by confining SNA gateways to local LANs.

GRAPHIC BY ANNE GIANCOLA SOURCE: *NETWORK WORLD*

When the gateway resides at the host site, data travels across the WAN link packaged in IPX or NETBIOS packets, which adds smuch more overhead compared to SNA. The gateway at the host site then repackages the data into SNA format for transport to the mainframe.

But, if the gateway is placed at the remote site, the IPX or NETBIOS overhead is confined to the local LAN and only the more efficient SNA traffic is carried across the WAN.

Today, most users deploy SNA gateways at a central host site because it enables the devices to be channel-attached to the mainframe. In addition, placing a gateway at each of the remote sites seems costly and wasteful when large gateways supporting hundreds of sessions can be deployed and managed centrally.

"On the surface, it makes a lot of sense to do that. But when you look below the surface, it can spell disaster," Tolly said. "When you take that inefficient session going over low-speed WAN lines and multiply it by hundreds of simultaneous users, the wasted overhead load you get is tremendous."

Although a centrally located gateway is easier to manage than multiple, far-flung devices, he said the drawbacks — poorer performance, increased WAN bandwidth requirements and greater potential for session crashes — outweigh that benefit. ■

McDATA

Continued from page 15

Card noted.

Making SNA nets easier to configure is the idea behind supporting IBM's DDDLU on the 7100. Traditionally, in order to attach new 3270 devices to an SNA net, the entire net had to be taken down so the devices could be registered to VTAM on the mainframe and the Network Control Program on the front-end processor.

IBM, which already supports the feature on its 3174, noted that DDDLU only sets up a temporary line of communications for the device. Ultimately, users will still need to take VTAM down to permanently register the new devices. But for large SNA users, having the ability to add devices on the fly is a major benefit.

The feature is also useful for remote users, enabling them to attach to the network immediately, rather than waiting for the VTAM programmer to add them to the net.

McDATA's DDDLU requires VTAM Version 3 Release 4 or higher on the mainframe. The feature is included in the controller's operating system, Software Release 4, which is available at no cost.

McDATA also announced last week that its Advanced SNA/IP software for the 7100 is now shipping (*NW*, May 31, page 5). Advanced SNA/IP encapsulates 3270 traffic in IP packets, enabling it to be routed across a TCP/IP net.

The software is an alternative to using SNA-to-Logical Link Control 2 conversion devices or having routers encapsulate SNA traffic in IP to ship it across a LAN internet, Card said.

The Telnet feature is available for $1,395. The Advanced SNA/IP feature is priced at $1,555. Both are available now.

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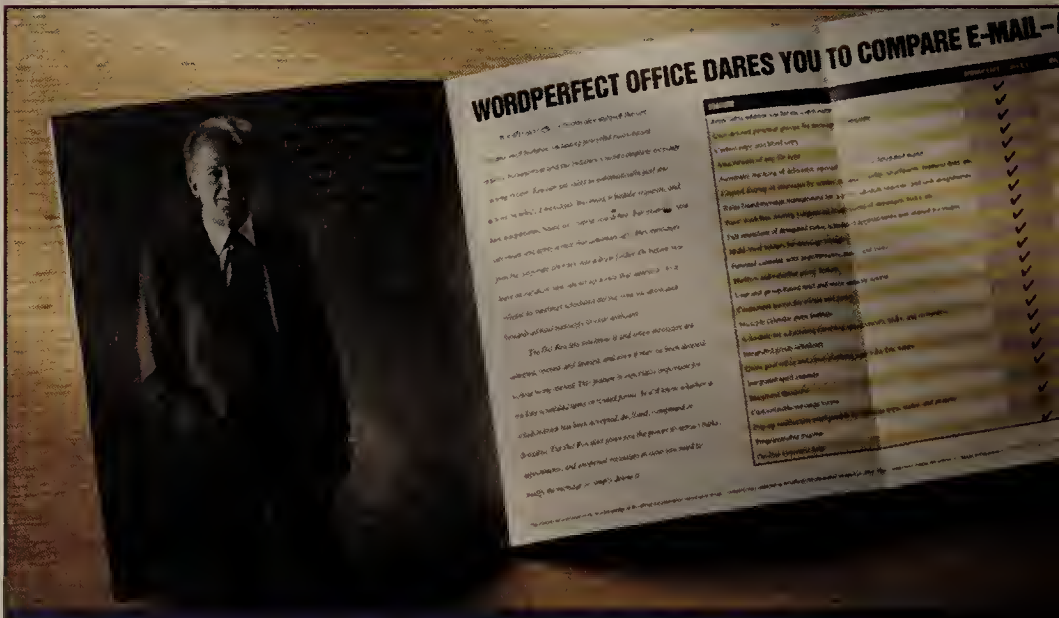

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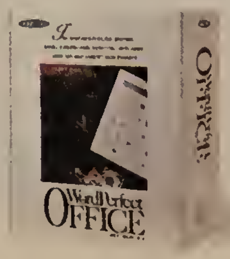

DECnet

Continued from page 12

"We're moving fast on TCP/IP due to the fact that we've lagged behind for so long," said Jim Deasy, manager of international marketing for DEC.

As testament to that, DEC recently started shipping TCP/IP Services for OpenVMS, Version 3.0, software that allows the vendor's Alpha processors to interoperate with other TCP/IP nodes (*NW,* Sept. 6, page 10). With enhanced performance and expanded features, Version 3.0 is a vast improvement over previous releases of the product, DEC officials claim, and may help lure DEC users away from third-party TCP/IP offerings.

One such user might be Dr. Pepper/Seven-Up Co. in Dallas. In the last year, the company has suspended DECnet/OSI deployment to put TCP/IP on its IBM MVS, DEC VMS and Unix machines, and on its Novell, Inc. NetWare local-area nets, said Steve Wharton, data communications analyst at Dr. Pepper/Seven-Up.

The company is adding TCP/IP addresses to all of its DECnet nodes, which allows it to use DECnet between DEC VAXes and TCP/IP to communicate with non-DEC equipment.

"We're not looking at TCP/IP as a complete replacement to DECnet by any means right now," Wharton said. "But it does [provide] some of the great things that we might pick up out of [DECnet/OSI]," such as interoperability and a larger address space than DECnet Phase IV.

Another factor keeping users from readily adopting DECnet/OSI is the Internet Engineering Task Force's Request For Comment 1006 specification, analysts said. RFC 1006 defines a method for accessing OSI applications using TCP/IP protocols.

DEC announced RFC 1006 support in DECnet/OSI for DEC OSF/1 AXP, Version 1.1, in July. And DEC officials say RFC 1006 support will soon emerge in other products.

Delays on DEC's part in delivering DECnet/OSI also stalled user migration plans.

Hughes Aircraft Co. in Long Beach, Calif., fitted its network with multiprotocol routers over two years ago to prepare for its transition from DECnet Phase IV to DECnet/OSI (*NW,* Feb. 25, 1991, page 2). But the continued delay of DECnet/OSI for VMS — it eventually shipped in November of 1992 — prompted Hughes to postpone that migration.

"As DEC retreated from their schedule, that project has sort of languished," said Gene MacLean, head of network planning and operations support for Hughes's Engineering Design Network. "Since that time, the importance of DECnet inside of Hughes has essentially lessened."

People on Hughes's DECnet/OSI project team were reassigned, MacLean said. MacLean himself is now responsible for Asynchronous Transfer Mode networking at Hughes.

Hughes is still interested in DECnet/OSI, MacLean said, because it is required by some applications that run on the latest version of DEC's OpenVMS operating system, Version 6.0.

"The issue will have to be reawakened," MacLean said. "But I can say with certainty that it's been dormant for at least the last year." ◪

Controllers

Continued from page 12

will not be able to fully implement those features across their networks.

The 3174 and 3745, meanwhile, will be given all the functions they need to be "full and active participants in the growing world of multiprotocol, client/server LAN-to-LAN communications," Lorrain said.

While these enhancements are welcome additions to aging boxes, analysts said, they are also the source of confusion for users unsure of which box to utilize.

"Many users out there are sweating the decision over whether their next purchase will be a 3745 or a cheaper 3172, which can handle some of the same duties," said Dave Passmore, vice president and service director for the Gartner Group, Inc. consultancy in Stamford, Conn.

Lorrain noted that the 3745 is the only IBM controller to implement such features as SNA data flow control and Systems Network Interconnection, which lets users link multiple SNA nets.

And IBM recently pledged support for increased communications lines, improved frame relay services and a variety of price/performance features for the 3745 (*NW,* Sept. 20, page 1).

But many customers no longer require the full range of SNA functions but do require LAN support. For them, the 3172 is an attractive option, Lorrain said. "The 3172 is also a good complement to distributed 3745s in large networks," he added.

The dividing lines between the 3745 and 3172, in practice, are not very clear. Lorrain said users with mostly SNA equipment and lots of SDLC traffic would not want to replace a full-blown 3745 with a 3172. But for those SNA users moving to TCP/IP or adding LANs, the 3172 would be the best answer. ◪

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LOCAL NETWORKS

Operating Systems, Management, Hubs, Adapters and Other Equipment

Proteon to unveil revamped adapter card line

BY SKIP MACASKILL

Westborough, Mass.

Proteon, Inc. this week is expected to announce it has reengineered its line of token-ring adapter cards by adding software enhancements and a new chip technology that boosts performance by up to 122%.

At the NetWorld 93 Dallas trade show this week, the company is also expected to announce its entry into the Ethernet market with a series of PCMCIA adapter cards.

The reengineered boards, the ProNet-4/16 Plus Series of network interface cards (NIC), feature Proteon's enhanced driver software, RapiDriver, which increases the cards' performance by 24%.

ProNet Plus optionally supports Texas Instruments, Inc.'s recently introduced Frame Processing Accelerator chip, dubbed the PacketBlaster. The PacketBlaster, an upgraded version of TI's existing Eagle chip, can transmit and receive data at 28K packet/sec.

"By employing the PacketBlaster option, users can double their throughput because the chip reduces software processing overhead," said Paul Demko, vice president and general manager of Proteon's LAN Products Division. "When combined with the higher performance that RapiDriver brings, it's possible for users to see performance improvements of 122%."

The new NICs will be available for three major types of buses, including the Industry Standard Architecture (ISA), Extended ISA (EISA) and Micro Channel Architecture (MCA). The EISA card has a flash boot memory option, while the MCA model features a 32-bit address bus interface that improves performance in servers with more than 16M bytes of main memory.

Through very large-scale integration and hybrid circuit technologies, Proteon reduced the physical size of the adapter from a full to a half board. All new models also come with two LEDs, indicating ring insertion and ring activity.

The ISA card is available now for $665; the EISA NIC will be available next month for $750; and the MCA card is due out in December for $665. All models come with the RapiDriver software, which is also available for the existing ProNet line via a software upgrade. The PacketBlaster chip, which can be installed by users, will be available in the first quarter of next year for $95.

Proteon will also announce it is developing a Peripheral Component Interconnect (PCI)-based token-ring card for delivery in the second half of 1994.

PCI is a bus standard developed by Intel Corp. that will allow video and other time-sensitive applications to access a NIC's local internal bus. That bus runs at the speed of the microprocessor, meaning more efficient performance over nonlocal-bus devices.

The company will also offer its first Ethernet product when it rolls out a PCMCIA adapter in mid-1994 that supports both Ethernet and token-ring local-area network connections. The card will be software-selectable for either environment.

Also by mid-1994, Proteon will unveil adapter cards that conform to the emerging 100Base-VG standard, which specifies how to run Ethernet at 100M bit/sec over copper-based voice-grade wiring. ⧉

Digging through all of the AppleTalk tunneling options

Sorting through the various AppleTalk extension techniques.

BY JOEL SNYDER

Confused by the number of AppleTalk tunneling options?

In the last two years, four new techniques for extending AppleTalk networks across Transmission Control Protocol/Internet Protocol backbones have been introduced, making it hard to get a handle on what might be best for your network.

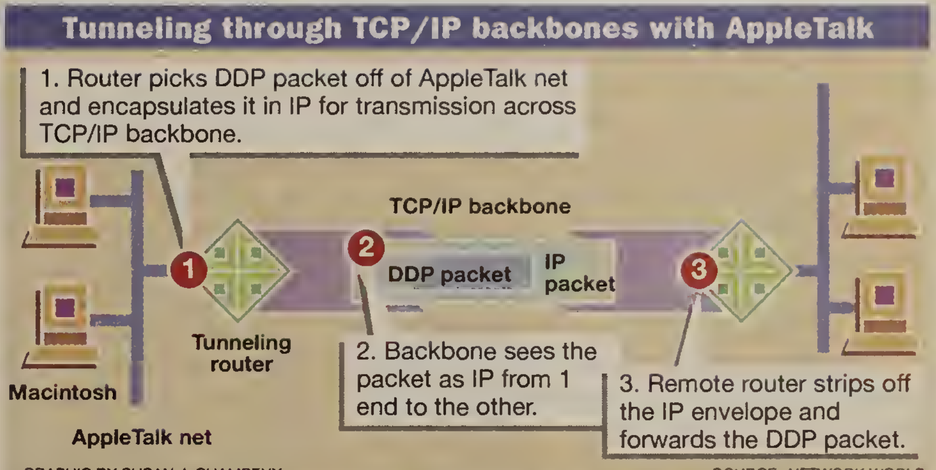
All four options sprung up to deal with the limitations of AppleTalk, which was introduced a decade ago as an innovative approach to networking Apple Computer, Inc. Macintoshes. AppleTalk brought automatic discovery of printers and servers, as well as user-friendly naming, and eliminated configuration hassles for network managers.

For small and midsize configurations, AppleTalk is the easiest network operating system to install and manage. But the very technology that makes it successful in these networks limits its appeal in large networks.

AppleTalk is a verbose protocol. Its routing protocol, the Routing Table Maintenance Protocol (RTMP), requires every AppleTalk router on an extended local-area network to broadcast its routing table every 10 seconds. If a router goes for 20 seconds without an RTMP packet advertising its presence, AppleTalk considers it gone.

In small networks, AppleTalk's approach to routing means that any topology change gets discovered quickly without manager intervention or the need to take systems down for reconfiguration.

Tunneling through TCP/IP backbones with AppleTalk


1. Router picks DDP packet off of AppleTalk net and encapsulates it in IP for transmission across TCP/IP backbone.
TCP/IP backbone
1
2
3
DDP packet
IP packet
Tunneling router
Macintosh
AppleTalk net
2. Backbone sees the packet as IP from 1 end to the other.
3. Remote router strips off the IP envelope and forwards the DDP packet.

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: *NETWORK WORLD*

DIRECTING RTMP TRAFFIC

In large networks, however, RTMP traffic can get out of hand. An extended AppleTalk network with 100 routers will burn up almost 25% of Ethernet's 10M bit/sec capacity just handling routing updates. That much routing traffic has another side effect: Routers will spend all their time passing around routing information and won't have any time left for the more important task of routing data packets.

AppleTalk routing breaks down in large networks for another

See AppleTalk, *page 28*

DEC Pathworks 5.0 to include NetWare, links

BY MARTIN LAMONICA

Valbonne, France

Digital Equipment Corp. is readying a major upgrade to Pathworks designed to give end users the ability to access multiple network operating system (NOS) environments from a single Windows-based personal computer.

To be announced next month for availability in January, Pathworks 5.0 will provide native Apple Computer, Inc. AppleShare, Microsoft Corp. LAN Manager and Novell, Inc. NetWare connectivity, said Richard Smith, PC integration program manager at DEC's development facility here.

The Pathworks 5.0 access application, tentatively called ManageWorks, presents a menu from which Windows clients can connect to servers running any of the three NOSes, DEC officials explained.

ManageWorks also includes several net management utilities, letting administrators add users as well as file and print services, and form work groups by simply dragging and dropping icons that represent network resources. Users can also graphically browse the network for available resources, such as file servers, terminal emulators and mail servers.

The ManageWorks client software can also exchange data with a server application,

See Pathworks, *page 27*

NETWORLD ROUNDUP

Chipcom Corp. this week will roll out its first stackable hub offerings. The first two products in the ONsemble Stackable 10Base-T Hub family include a 12-port Base Hub that comes with full Simple Network Management Protocol capabilities and an unmanaged 12-port Expansion Hub. Four Expansion Hubs can be stacked on the Base Hub to form a logical repeater that supports up to 60 end nodes.

Available in 60 days, the Base and Expansion Hubs will cost $1,595 and $1,195, respectively.

Chipcom: (508) 460-8900.

Fibermux Corp. this week will unveil a new Simple Network Management Protocol-based management module for its Crossbow intelligent hub line that is designed to manage multiple Ethernets in a collapsed backbone environment. The Collapsed-Backbone Ethernet SmartLink module can be configured to control as many as 14 Ethernet nets, including all attached servers and internetworking devices.

The module also acts as an Ethernet interface module, supporting eight 10Base-T ports and two fiber ports.

Available now, SmartLink costs $3,895.

Fibermux: (818) 709-6000.

Xyplex, Inc. this week will introduce its 3140 Expandable Workgroup Hub line, stackable hubs that can be managed as one logical repeater when connected together. The 3140 is a 24-port 10base-T hub that supports the Simple Network Management Protocol. The 3141 also comes with 24 10Base-T ports and can be stacked on top of the 3140, supporting 48 end-stations.

Available now, the 3140 and 3141 cost $2,195 and $1,395, respectively.

Xyplex will also roll out the 3350 FDDI Concentrator, a stand-alone eight-port Fiber Distributed Data Interface hub that supports either fiber or copper connections for both single- and dual-attached

See Roundup, *page 27*

Spry updates Windows TCP/IP connectivity apps

BY CHRISTINE BURNS

Seattle

Spry, Inc. last week upgraded its Windows software to let users establish connections with mainframes, Unix X Window Systems and the Internet while maintaining current local-area network links.

The new product, AIR Series 2.0, builds on AIR for Windows 1.0, released in June 1992. That product let personal computer users log into a Unix host without having to reboot their machines. The user simply clicked on an AIR for Windows icon to get a Windows VT-220/102/52 terminal-emulation session running and could then use the file-transfer protocol and telnet.

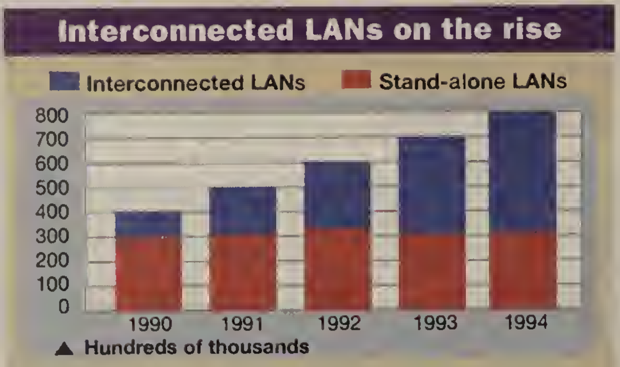
Air for Windows 1.0 supported concurrent protocol connectivity, including Novell, Inc. NetWare and Transmission Control Protocol/Internet Protocol access using the Network Device Interface Specification or Open Data Interface driver standard.

"There is no question that the mainframe, Unix and PC LAN communities using TCP/IP as their basic transport protocol are coming together to share resources," said David Pool, president and chief executive officer of Spry. "The challenge with connecting the disparate systems lies in making them talk the same TCP/IP language."

While vendors are working to establish a standard TCP/IP application program interface (API) called the Windows Sockets API, implementations are inconsistent across vendor lines, Pool said.

Each application announced by Spry is shipped with its own Application to the Socket (App2Sock) interface that shields the user from the underlying TCP/IP transport. App2Sock supports Microsoft Corp.'s Windows Sockets, Novell's WLIPSOCK and SunSelect's TKLIB socket libraries.

The enhanced product, the AIR Series 2.0, includes support for 3270, X Window System and Internet access.



While the number of stand-alone LANs has remained relatively stable since 1990, the number of interconnected LANs has increased fivefold. Interconnected LANs are expected to outnumber stand-alone LANs by the end of next year.

GRAPHIC BY ANNE GIANCOLA SOURCE: THE YANKEE GROUP, BOSTON

The AIR tn3270 application supports 3270 terminal emulation for mainframe connectivity as well as an AIR X application, which is an X server that allows a PC to display applications running on remote multiuser systems.

While in AIR X, users can cut and paste both text and graphics between X clients and Windows applications as well as initiate X client sessions using preconfigured icons in Windows Program Manager.

AIR Navigator is a suite of TCP/IP connectivity applications that guide PC users through the Internet resources, like public domain files and information databases.

AIR Mail is a Windows-based implementation of Internet mail that lets users send mail to other individuals on the Internet.

AIR News is a Network News Transfer Protocol news reader that gives users access to the Internet news groups and industry headlines. News articles obtained via AIR News can be saved to files and printed or copied to other Windows applications.

Air Gopher is an Internet search and retrieval application used to search for specific information available on the Internet. This interface enables users to access all of the Internet services and databases without knowing the names of the resources.

All AIR Series 2.0 applications are available now and are shipped as modules ranging in price from $129 to $429.

©Spry: (206) 447-0300.

Asante ties into Novell's NMS 2.0 management system

BY CARYN GILLOOLY

Dallas

Asante Technologies, Inc. this week is expected to bring out AsanteView for NMS 2.0, software that lets network administrators manage Asante hardware as well as Novell, Inc. servers on NetWare local-area networks.

The product, to be announced at NetWorld 93 Dallas, consists of two pieces of software that work with Novell's newest release of its NetWare Management System (NMS), Version 2.0.

AsanteView provides auto-discovery mapping to graphically depict the location of each Asante device on the net.

Novell's NMS consists of the NMS Agent, NMS Server and NMS Console. The NMS Agent is a terminate-and-stay-resident (TSR) program used on each device to be managed. Agents send management information to the NMS Server, where most of the data is processed. From the NMS Console, the administrator can then see and manipulate the information within the server.

The first piece of the Asante software is a TSR program that resides within the devices the administrator wants to manage — akin to the NMS Agent but specific to Asante's product line.

Using the Asante TSR, administrators can manage the AsanteHub 1012 and 2072 departmental hubs, the AsanteBridge 1012 and 2072 bridge modules as well as NetWare servers themselves.

Using the Simple Network Management Protocol, the AsanteView application on the NMS Server collects information, such as port configuration and performance statistics, from the various agents throughout the network. Through the combination of AsanteView and Novell's NMS Console, the administrator can then view the information.

In addition to statistical information, the software provides auto-discovery mapping capabilities to graphically depict the location of each Asante device on the enterprise net.

The administrator can also use AsanteView to set performance thresholds and receive alarms when thresholds are met or exceeded, and then enable and disable ports from a central location.

AsanteView for NMS 2.0, consisting of both the management software and hub agent, will be available in the first quarter of next year for $1,299.

©Asante: (800) 662-9686.

Pathworks

Continued from page 26

called Configuration, Monitoring and Tuning (CMT), which lets administrators configure clients and servers remotely, as well as analyze network traffic over time and tune performance, Smith said. CMT runs on OSF/1 and VMS.

About half of DEC's clients in Europe access its hardware through the Pathworks environment while concurrently running NetWare local-area nets on Intel Corp. platforms, he added.

Pathworks 5.0 will support a range of network protocols including NetWare Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), AppleTalk, DECnet, Transmission Control Protocol/Internet Protocol and IBM Network Basic I/O System Extended User Interface.

Pathwork server licenses, available for OS/2, Windows NT, SCO Unix, OSF/1 and VMS, cost between $300 and $500, Smith said. Pricing is $200 per client, which gives end users access to all available Pathworks servers. The software includes a graphical template to ease installation of Pathworks clients.

Separately, DEC has developed an add-on to Pathworks 5.0 that allows remote PC users to run distributed applications over X.25 networks.

The DOS/Windows-based software product, which is set to be announced next month, uses the CCITT X.32 standard for multiplexing as many as four synchronous channels onto an X.25 link at speeds of up to 9.6K bit/sec. With the appropriate X.25 card and Pathworks module, a remote client can run file-sharing applications, access and send files as well as backup data over packet networks.

The X.32 product is aimed particularly at mobile users or remote offices in markets where public X.25 services are relatively inexpensive and in countries where establishing a reliable asynchronous line is difficult, according to Product Manager Andre Naccache.

Synchronous transfer can be cost-efficient for low-volume needs because X.25 charges are generally based on the number of packets sent rather than connect time, he continued. The upgraded product supports TCP/IP as well as DECnet protocols.

➻LaMonica is a European correspondent for IDG News Service.

ROUNDUP

Continued from page 26

devices.

The fiber version costs $9,750, while the copper model costs $6,750. Both products are available now.

Xyplex: (508) 264-9900.

Optical Data Systems, Inc. (ODS) this week will announce LanVision/HP OpenView for Windows, Simple Network Management Protocol-based net management software that runs on top of Hewlett-Packard Co.'s net management platform and manages all ODS hubs on a net. The release complements ODS' LanVision versions that support OpenView for Unix, SunConnect's SunNet Manager and IBM's NetView/6000.

The software offers a hub management interface that graphically portrays a hub's front panel, providing at-a-glance port status and control.

Available in November, the new LanVision version will cost $4,000.

Alantec Corp. this week will make a series of enhancements to its PowerHub intelligent switching hub, like support for the AppleTalk protocol in its routing software suite, which currently includes the Internet Protocol, Internetwork Packet Exchange (IPX) and DECnet. The PowerHub can route AppleTalk traffic at 67,000 packet/sec.

Alantec also added new Simple Network Management Protocol features, including support for the Bridge Management Information Base (MIB), which provides access to bridging tables and Spanning Tree statistics, and the Ethernet MIB, which compiles Ethernet statistics like collisions and frame errors. Net managers will also have the capability to do SET commands.

AppleTalk routing and the management upgrades will be part of the next version of the software that is expected in the fourth quarter. The AppleTalk support will cost $1,250, while the management features will be free.

Finally, Alantec is adding a single-mode Fiber Distributed Data Interface module to its product line. The module will increase the distance limitations of multimode fiber from 2 to 20 km.

Also available in the fourth quarter, the FDDI module costs $19,995 for a two-port single-mode model and $14,995 for a version that has a single-mode port and one multimode port.

Alantec: (408) 955-9000.

DigiBoard has released communications software that allows Novell, Inc. NetWare servers to manage Integrated Services Digital Network dial-up links to remote nodes. PC IMAC for NetWare Systems is software for use with a DigiBoard PC IMAC Integrated Services Digital Network remote LAN connection card plugged into a NetWare server and controls what type of data flows across the link.

The software is now being shipped with the PC IMAC ISDN remote LAN connections cards for $995.

DigiBoard: (612) 943-9020.

AppleTalk

Continued from page 26

reason — AppleTalk supports no more than 15 hops between any two AppleTalk systems. With an extended backbone of sufficient size, it may be impossible to use AppleTalk from one end of the network to the other.

Furthermore, many managers don't like running AppleTalk routing on the corporate backbone. Keeping a large backbone running that supports DECnet, Systems Network Architecture or the TCP/IP is hard enough without adding support for AppleTalk.

Adding AppleTalk means additional configuration and management complexity in routers. That overhead can be out of the question in a budget- and resource-stressed net.

Cayman Systems, Inc. introduced the world to the concept of AppleTalk tunneling in 1989 to solve these and other problems. Using Cayman Tunnels — since renamed SEDI, or Simple Encapsulation of DDP in IP — a router can encapsulate AppleTalk packets in TCP/IP packets for transmission across a TCP/IP net.

Simple tunnels, such as SEDI or Cisco Systems, Inc.'s Generic Route Encapsulation (GRE), let a network manager build a virtual AppleTalk network over a TCP/IP network.

Simple tunnels are simple indeed. A tunneling router on one AppleTalk network picks off AppleTalk DDP packets, places them into IP packets on the TCP/IP network and sends them to a tunneling router at the other end of the IP network that unpacks the packet (see graphic, page 26).

Cayman's SEDI has become an industry standard. Network routers from Cayman, Cisco, Compatible Systems, Inc. and Farallon Computing, Inc. all support SEDI and can interoperate with one another. Cisco's GRE can encapsulate other protocols — such as Internetwork Packet Exchange (IPX) and IP — in addition to AppleTalk, but no other vendor supports GRE.

Although SEDI and GRE both solve the basic problem of connecting AppleTalk networks over a TCP/IP backbone, neither does anything to reduce the amount of RTMP traffic that AppleTalk routers generate.

INTRODUCING TREDI

To solve that problem, Cayman recently introduced Traffic Reduced Encapsulation of DDP in IP, or TREDI, as an extension to SEDI. The main difference between SEDI and TREDI is in the routing. A TREDI router at one end of an AppleTalk tunnel only transmits RTMP packets when there is a change in the network topology.

For a stable network, this means that the IP tunnel isn't jammed with routing packets carrying redundant information. When a topology change occurs, the TREDI router passes the RTMP packet to its counterpart at the other end of the tunnel.

If there is no change, the TREDI router discards the RTMP packet. At the other end, it is the responsibility of the counterpart TREDI router to generate "fake" RTMP packets for transmission on its local AppleTalk network. This technique allows the network manager to link AppleTalk networks without wasting TCP/IP backbone bandwidth.

TREDI is backward-compatible with SEDI; a TREDI router that connects to a SEDI router will fall back to SEDI operation. Cayman has announced that it will be shipping TREDI-compatible routers later this year.

Dr. Pepper, published by the AppleTalk Networking Forum, is similar to TREDI. Dr. Pepper, also called TunnelTalk, has been implemented by Shiva Corp. in the latest version of its AppleTalk router software.

SEDI is designed for simple tunnels where size is not a problem. Dr. Pepper and TREDI both go a step further by reducing the amount of routing traffic.

BUILDING WITH AVRP

The high end of AppleTalk encapsulation approaches was designed by Apple and has been published as Apple Update-Based Routing Protocol (AURP). Farallon and Apple are currently the only vendors to include AURP in a router product.

AURP is the next step in AppleTalk routing, a feature-rich extension to the AppleTalk protocol. AURP defines AppleTalk tunnels through both TCP/IP networks and over point-to-point links using the Point-to-Point Protocol.

AURP also includes a mechanism for reducing routing traffic, additional security through network and device hiding, and network number remapping and clustering.

"AURP lets different organizations build huge AppleTalk networks without making changes to the existing network," said Alan Oppenheimer, one of Apple's network protocol architects. "You can't do that with [Dr. Pepper or TREDI]."

One powerful feature of AURP lets network managers remap AppleTalk network numbers into unused ranges. Each zone in an AppleTalk network must have a unique number. Connecting two networks that have not been administered as one usually means numbering conflicts. AURP solves this problem with number remapping. Network number 100 can be automatically translated to network 3,000 across an AURP tunnel to avoid a collision, and only the local router needs to know this.

To demonstrate the power of AURP, Apple has established on the Internet what it calls the AppleTalk Internet. Any AppleTalk network connected to the Internet can join the AppleTalk Internet simply by installing Apple's Internet Router software and building a tunnel over the Internet.

Today, the AppleTalk Internet links 16 different sites, from huge universities to tiny software vendors. All together, the AppleTalk Internet has more than 200 AppleTalk zones.

OTHER REASONS TO TUNNEL

Tunneling AppleTalk through TCP/IP is also a useful tool in handling incremental growth of an AppleTalk network. Because the traffic in an AppleTalk tunnel is completely transparent to the TCP/IP network, organizations can use AppleTalk tunneling to build experimental, private and virtual AppleTalk networks.

A virtual AppleTalk network would allow the network manager to give access to new, untested protocols and services to testing centers without fear of disturbing production systems. Tunneling can also be used in outsourcing efforts to link AppleTalk networks across a public or private TCP/IP backbone.

When the University of Arizona's Center for Computing and Information Technology wanted to demonstrate its Apple-based Student Information System, they used Apple Internet Routers. The Internet let it link an OpenVMS-based information server to a single Macintosh at a university in Texas easily and without fear of disturbing existing networks on either campus.

Tunneling can solve problems, but it can create them, as well. Tunneling, especially using complex protocols such as Dr. Pepper, AURP and TREDI, places a load on routers that may require CPU or memory upgrades.

Tunnels can also be a security problem. A network "fire wall," which stops AppleTalk traffic and passes TCP/IP traffic, won't necessarily keep tunneled AppleTalk data from getting through.

Tunneling has implications for routing, as well. A careless network manager could end up routing traffic from San Francisco to Los Angeles via Tokyo if network topology isn't carefully constructed.

If you think there are too many tunneling technologies to choose from, you're right. For small nets with high-speed backbones, SEDI products are available from several vendors.

Network managers who do not want to waste backbone bandwidth are in a quandary. With TREDI and Dr. Pepper providing nearly identical service, and vendors like Cisco sitting out the battle by establishing proprietary tunneling protocols, the choice is hard.

TREDI is being promoted by the AppleTalk tunneling leader, Cayman, while Dr. Pepper is a vendor-neutral specification from a consortium of networking companies.

Apple's nonproprietary AURP remains the high-end solution, but few vendors have included AURP in a router product. Others are sure to follow, but choosing AURP today means a lonely start. For multiorganizational networks and very large ones, though, AURP-based routers are the only reasonable choice.

➻ Snyder is a senior partner at Opus One Tucson, Ariz., specializing in telecommunications and international aspects of information technology. He can be reached via the Internet at jms@Opus1.COM or at (602) 882-4094.

ELECTRONIC MAIL

by Mark Gibbs

Manners make the message

One of the most used and useful facilities in networks of all kinds is electronic mail.

While E-mail is conceptually similar to regular mail — "snail mail," as E-mail aficionados like to call it — it is not just faster, it is actually quite a different medium.

E-mail messages can be filed, retrieved, copied, distributed, deleted and modified all at the touch of a button. This contrasts with regular mail, which can be filed in minutes — if you're really good — and never found again.

In this high-speed network environment, casual and ill-considered messages are frighteningly easy to create and send. In a company environment, these messages can result in hostility, misunderstandings and aggression — behavior that is obviously best avoided. But how can we avoid them if we don't teach users E-mail manners?

We need to develop "netiquette," etiquette for network conduct. There are many aspects to netiquette, but the one I want to discuss here is in regard to E-mail. We send people to take courses on how to answer the telephone, why not courses on how to use E-mail?

Part of the foundation for E-mail netiquette is to establish some corporate standards for E-mail use. For example, there's the issue of nuisance value.

It might be preferable for social announcements conveyed by E-mail to always have the same start in the subject line, such as "Social." This would allow people not interested in reading these messages to filter them out. Better still, it could ensure that distribution lists for social topics exist for those people who want to be on them.

Out in the big wide world, the problem of rude and ill-mannered E-mail is far worse. I received a letter the other day from an Internet user requesting advice on how to handle the "invasion" of a discussion group (a listserv "list") by another group. The invaders in question belong to a group called alt.tasteless. I think their name gives you a sense of the high-brow material that gets exchanged.

The invaded group (members of which simply wanted to talk about cats) was rather agitated when the invaders posted hundreds of messages ranging from the simply offensive to the downright obscene. The cat lovers were outraged, but there seemed nothing they could do.

In fact, this was the case. My advice was to respond by consciously doing nothing. They should ignore the offending messages, and the invaders would eventually get bored and go away. (Ever had kids ring your doorbell and run? Same principle.)

Now, why should people form and be involved with a group called alt.tasteless, let alone bug other people.

The fact is that networks — in particular, the Internet — are not only electronic frontiers, but social ones as well. And when you consider that people hardly know how to handle themselves politely in the real world, it is asking a lot to expect them to behave themselves as disembodied presences on a global communications system.

That makes me ponder the question of how many E-mail hoodlums are being ill-mannered using their company resources and with their company's tacit permission. If someone on your staff is guilty of this, you should consider whether such behavior is likely to reflect badly on your organization. I suggest it will.

But there's also the problem of catching them. Monitoring E-mail is not recommended. Without getting into the ethical ramifications of monitoring, it's potentially an incredible workload without a quantifiable payback. The only real approach lies in training and culture.

It's about time we start thinking about civilizing our E-mail and developing netiquette. And the best place to start is in our own organizations by making netiquette a corporate issue.

➻ Gibbs is a consultant and writer based in Ventura, Calif. He can be reached via E-mail on CompuServe at [75600,1002] or on the Internet as mgibbs@rain.org.

THIS SHOULD GIVE YOU OF WHY WE CREATED AN

The image you see over there started out attached to the image you see over here. But as it made its way to the printer, the computer it was created on recognized a problem: 11 x 17 pages can't fit on 8½ x 11 paper.

And so, out came the electronic scissors.

Now, if you're like a lot of people, you know all about this routine. And you know how it feels to walk into a meeting with a presention that contains hours of blood, sweat and tears, and a big fat strip of tape going right down the middle of it. Enough said.

COMPAQ PAGEMARQ Network

CONNECTIVITY OPTIONS

COMPAQ PAGEMARQ Printers can be directly connected into the following environments: NetWare, EtherTalk, LocalTalk, LAN Manager, LAN Server, Windows NT, and TCP/IP (including Sun, HP, SCO, IBM, DEC and lpd compatible hosts).

Laser printers were built to help put an end to all of that. They can print 11 x 17 pages in a single pass. They come with up to three paper

trays, which lets you switch between paper sizes without leaving your desk, so you don't have to pull one paper tray out and replace it with another, only to have your neighbor

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A PRETTY GOOD IDEA
11 x 17 LASER PRINTER.

repeat the process two minutes later. They hold up to 1,500 sheets of paper. And for people whose design ambitions extend beyond Helvetica Bold, PAGEMARQ Printers offer two ways to expand your type library, eliminating the need to continually download from your computer. You can add 1- and 2-MB Programmable Font Modules, or you can add an internal 60-MB Hard Drive.

COMPAQ PAGEMARQ 20

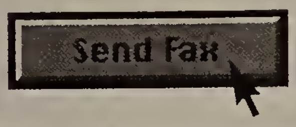
All of which print with razor-sharp clarity thanks to the 800 x 400 dpi-high-resolution mode.

Of course, both the COMPAQ PAGEMARQ Laser Printers are fully backed by CompaqCare, our extensive service and support program. Which includes a one-year, on-site* limited warranty as well as unlimited toll-free telephone support. All at no additional charge whatsoever.

If you're interested in learning more, just call us at 1-800-345-1518 in either the U.S. or Canada.

We'll show you how to keep big ideas in one piece. At least until your client sees them. **COMPAQ**

A typographer's dream, these printers can store 1,500 fonts. Of course, not all of us dream about type. In which case, the 35 fonts that come standard are more than adequate.



Add an Internal FAX Modem and you can turn your PC into a personal fax machine. One that will send and receive true Adobe PostScript quality faxes in any size up to 11 x 17.

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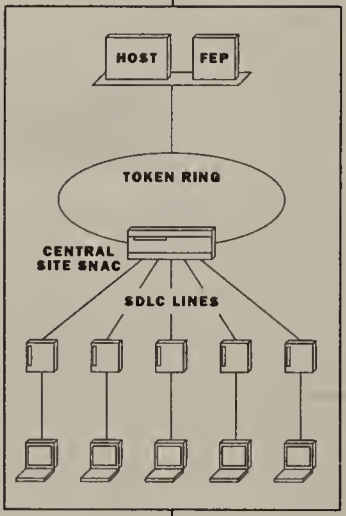
Circle Reader Service #28

"SYNC'S CENTRAL SITE SNA CONVERSION SAVED [redacted] FOR US AT [redacted], BUT YOU DIDN'T HEAR IT FROM ME."

You owe it to yourself to discover the backroom secret for inexpensively opening SNA. With the Central Site SNA Conversion Node (CS SNAC,) you downsize or eliminate FEPs now, and smoothly open your SNA network with a platform for the further evolution of internetworking. Only Sync Research, the most trusted name in internetworking SNA, has it.

"We've got our SNA network centered in [redacted] and remote LANs in [redacted] and [redacted]. Adding front-end processors would've meant financial bloodshed to the tune of $[redacted] out of the box, plus an extra $[redacted] in service contracts."



Short-term, the CS SNAC offers potentially enormous savings. Longer term, by opening SNA, your huge SNA network investment can evolve gracefully, adopting key new technologies and standards like frame relay or APPN when the time seems right. Just as important, installation is transparent, avoiding any disruption of on-going operations.

"[redacted] and [redacted] could never solve this as well. They know networks, but they're new to SNA."

SDLC requires substantial FEP resources. But a single CS SNAC can replace up to 28 direct connections, supporting—via multidrop—hundreds of PUs. You can use much smaller FEPs or, in remote concentration applications, replace them altogether.

"My boss is a guy named [redacted], and he's a real beancounter. So when the guys from Sync showed us how to save about $[redacted] he plain told his secretary to stop taking calls from [redacted] and [redacted]."

Sync specializes in large-scale SNA connectivity. With over a decade of experience in IBM environments, Sync is expert in maximizing availability and minimizing costs.

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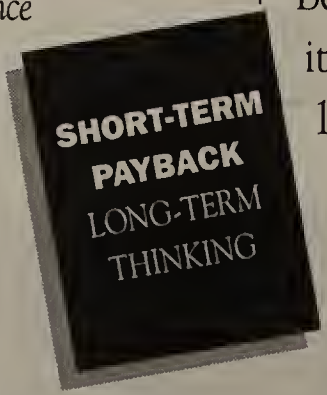

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[redacted]
Director of Information Systems,
[redacted] Inc.

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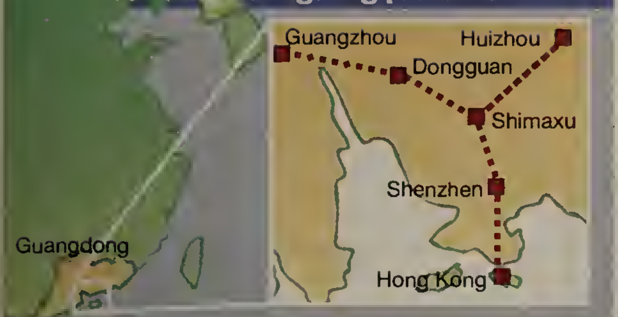
Hong Kong: Gateway to China
High-speed lines reach into China's booming Guangdong province.



Situated on China's southern coast, Hong Kong serves as an entrepot for trade with China's Guangdong province, whose gross economy is growing at 20% per year. Hong Kong Telecommunications runs a 140M bit/sec link and a new 560M bit/sec link into the province.

SOURCE: HONG KONG TELECOMMUNICATIONS, LTD., HONG KONG

High-speed cables, X.25 nets reach into China

BY BILL BURCH

Washington, D.C.

For more than a century, Hong Kong has served as an entrepot for China, an intermediary center for trade that linked the country's interior to the outside world.

Today, the crown colony serves as a telecommunications hub for links into Guangdong, a Chinese province to Hong Kong's north that is growing at an inflation-adjusted 20% per year. For multinationals such as Korea's Samsung Corp., the province is both a source of cheap labor and an alluring new market.

Hong Kong had once been known for manufacturing cheap goods, but now much of that industry has moved north into China; Hong Kong-based companies today employ more than three million people in the province. To connect businesses with operations in the province, a pair of Hong Kong Telecommunications, Ltd. fiber cables runs into China. A 140M bit/sec cable installed in 1988 links Hong Kong to Donguan, Guangzhou, Huzhou, Shenzhen and Shimaxu, while a 560M bit/sec cable completed in June 1992 links Hong Kong to Shenzhen.

For China as a whole, Hong Kong Telecommunications runs a total of 200 leased line circuits of up to 64K bit/sec into the cities of Beijing, Shanghai, Guangzhou and Shenzen. Annual growth in leased lines between Hong Kong and China is about 50% per year.

Firms use the leased lines for voice and data, along with some video. As in the U.S., the data traffic is a mix of Systems Network Architecture and Transmission Control Protocol/Internet Protocol, and the carrier is seeing a shift to TCP/IP, said Andrew Mutch, private net and data manager for Hong Kong Telecommunications. Altogether, more than 70 multinationals operating in China have leased lines that pass through or terminate in Hong Kong, including Hewlett-Packard Co., Northern Telecom, Inc. and Motorola, Inc.

"Western companies have fairly well-established global networks," Mutch said. "They know exactly what they want, and this has been a driving force behind the increase in data traffic in southern China."

For the most part, the companies need 64K lines to hook into their global network via a Hong Kong hub, Mutch said. The lines typically carry multiplexer-compressed private branch exchange traffic, along

See **China**, *page 36*

U.S. cellular telephone service celebrates 10th anniversary

Users can expect cellular packet data services by year end.

BY ELLEN MESSMER

Washington, D.C.

Cellular telephone service in the U.S. celebrates its 10th anniversary next week, with the number of users having grown to 13 million since mid-October 1983 when Ameritech, then part of AT&T, launched service in Chicago.

Cellular service, now available from 470 carriers in 734 "duopoly"-based U.S. markets of two competing carriers each, still costs more than comparable land-line services. But with 300,000 new subscribers signing up every month, cellular is here to stay for the business user, who can now look forward to the rollout of cellular packet data services by year end.

Back in 1983, the initial estimate of cellular usage was rather modest, but cellular turned out to be a business tool people couldn't live without, said Evan Richards, a vice president at Ameritech Cellular Services who was there when the first cellular phone service was activated.

Nowadays, it is not too unusual to see businesses issue requests for proposal to buy hundreds of cellular phones and minutes, Richards added.

However, according to a recent poll of 660 cellular phone users by The Gallup Organization, only 34% of users said their businesses pay for cellular service, 3% said they split the cost with their employer, and the rest said they personally cover the cost.

There's good reason for businesses to be wary about picking up cellular tabs — the costs can mount up. Users face additional charges for features such as itemized billing and "roaming," the ability to use a phone outside one's home service area.

The General Accounting Office (GAO) report released this September on the cellular industry showed that most cellular service providers charge for itemized billing (see graphic, this page).

Rep. Edward Markey (D-

See **Cellular**, *page 35*

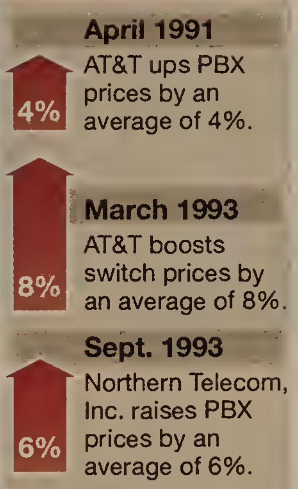
Cellular billing trends

The GAO report concerning cellular billing in the 62 largest U.S. cellular markets finds that:

- In 32 markets, both licensed carriers charge extra for detailed billing under at least 1 of the service plans offered.
- Detailed billing charges average $3.65 per month.
- 7 of the 11 largest carriers – Ameritech Corp., BellSouth Corp., CCI, Inc., GTE Corp., McCaw Communications, Inc., Southwestern Bell Corp. and Sprint Corp. – charge for itemized billing. Bell Atlantic Corp., Nynex Corp., Pacific Telesis Group and US West, Inc. generally do not.
- The practice of charging for cellular billing is twice as prevalent in the lowest cost cellular markets as it is in the highest cost markets.

SOURCE: GENERAL ACCOUNTING OFFICE (GAO), WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

PBX prices continue to climb



April 1991
AT&T ups PBX prices by an average of 4%.

March 1993
AT&T boosts switch prices by an average of 8%.

Sept. 1993
Northern Telecom, Inc. raises PBX prices by an average of 6%.

After cutting prices repeatedly in the 1980s, switch vendors began pushing them back up in 1991.

SOURCE: *NETWORK WORLD*
GRAPHIC BY SUSAN J. CHAMPENY

Northern Telecom to boost PBX rates by an average of 6%

BY BOB WALLACE

Richardson, Texas

Northern Telecom, Inc. last week increased the base price for its full line of Meridian SL-1 and Meridian 1 digital private branch exchanges by an average of 6%.

The cost of line and trunk cards, which typically comprise 35% to 80% of the cost of a Northern Telecom PBX, will go up more than 10%. Prices for telephones and voice mail did not change.

Northern Telecom's PBX price hikes come six months after AT&T announced an average 8% increase for its line of Definity Generic 3 PBXs. (see graphic, this page) AT&T's higher prices also covered maintenance rates. Northern Telecom's do not.

But analysts see a silver lining in the dark cloud.

"Northern Telecom is still coming in two percentage points below AT&T as far as price increases are concerned," said Warren Williams, vice president of Eastern Management Group, a Parsippany, N.J., consultancy. "Northern could have gone higher and broadened the increases to cover more than just line and trunk cards, but they didn't."

According to Jane Kauffin, an industry analyst with Dataquest, Inc., a consulting and research firm in San Jose, Calif., higher prices won't get in the way when Northern Telecom needs to land a big account.

"There's usually a big difference between a list price and the actual sales price of a PBX," Kauffin said. "I don't think the new [higher] prices will stand in the way of discounting in an incredibly competitive market." ▣

BRIEFS

MFS Communications Company, Inc. last week announced plans to build an all-fiber, 50-route-mile net linking 44 locations in Tampa, Fla., the alternative access provider's 16th metropolitan-area network. Net construction will begin immediately, with service available in the first quarter. MFS will provide private-line, local access and switched services over the new net, which will also be linked to MFS' national Asynchronous Transfer Mode-based network.

Separately, MFS subsidiary **MFS Communications, Ltd.** received approval from the U.K.'s Department of Trade and Industry to build a 16-km, all-fiber metropolitan-area network serving business and government users in London. The company will begin offering switched voice and private-line services early next year.

MFS: (708) 218-7200

AT&T has announced new rates for its Switched Digital International (SDI) service that are roughly 40% below current peak rates for the offering and has extended the service to businesses in the Philippines. In the past, users were charged one rate, regardless of when they used SDI.

Under the current rates, using two 64K bit/sec SDI channels for a 30-minute videoconference to Japan at peak hours (4 p.m. to 11 p.m. in the U.S.) costs roughly $155. With the new off-peak rates, the same SDI call would cost $96. The rates took effect Oct. 4.

AT&T: (800) 222-7956

Southwestern Bell Telephone Co. and **Ericsson** have signed an agreement under which the switch vendor will upgrade more than 200 of its AXE central office switches to support emerging calling services. The move will eventually enable Southwestern Bell to offer Custom Local Area Signaling Services, including Call Return, Call Blocker and Caller Identification.

RATE & TARIFF MONITOR

by David Rohde

CAPs invade the suburbs

Look out your office window — if you have one. If you see parking lots and shopping malls instead of taxicabs and subway entrances, don't despair about getting alternative dedicated access for your high-volume switched and private-line communications. You're probably in one of the new suburban "Edge Cities" now being eyed by competitive access providers (CAP).

Better known for setting up fiber rings in midtown Manhattan and the Chicago Loop, CAPs are aiming to move into suburban business centers — such as Route 128 around Boston, the Perimeter area of Atlanta, northwest of Chicago in the town of Oak Brook, Tysons Corner in the Virginia suburbs of Washington, D.C. and Walnut Creek in San Francisco's East Bay area.

The most striking example is the connections set up by Metropolitan Fiber Systems, Inc. (MFS) in the Washington, D.C. area. You'd expect the MFS network to extend to most of the central offices in downtown Washington and Capitol Hill. But according to documents obtained by the Center for Communications Management Information (CCMI), MFS also provides service in 11 central offices throughout suburban Maryland and 13 in northern Virginia — all of which serve multiple area code/exchange combinations.

Another example is the mushrooming Dallas network of Teleport Communications Group, Inc. (TCG). TCG started in downtown Dallas in 1990 but has since expanded to Addison, Carrollton, Farmers Branch, Irving, Plano and Richardson, Texas — and just completed a link to Dallas/Fort Worth Airport.

That situation isn't duplicated everywhere. MFS nets in Chicago, Houston and Minneapolis right now extend only to wire centers and exchanges in the central city, and the Boston area shows service outside the city only for exchanges in Brookline, Quincy and Winchester, Mass. Even in Los Angeles, the MFS net is confined to the downtown area, except for the Lomita, Calif., central office.

But an MFS official told the CCMI that the Chicago net will soon expand to the suburbs. And the company's San Francisco network is slated for expansion to San Jose, Calif., to create a Silicon Valley alternative access option.

Finding out whether a CAP serves your exchange isn't a matter of looking up a tariff, as it is with most service selection questions. But it provides you with an opportunity to shape the course of events.

For starters, all of the U.S. telephone companies' wire centers are listed in the National Exchange Carrier Association's FCC Tariff #4. But CAP service isn't included in this tariff.

CAPs do provide interstate access services, and, like all carriers providing any kind of interstate service, they now have to file Federal Communications Commission tariffs. But they file under the liberalized "nondominant carrier" rules instituted this year. Those rules forestalled the avalanche of documents that would have resulted if every CAP, cellular carrier and reseller had to file under the stringent rules that apply to AT&T. What's more, even if a CAP provides you with a list of the exchanges it serves, it doesn't necessarily mean that every building in a particular exchange is covered.

The best idea is to call the alternative access provider to see if your building is served. The very fact that you express interest could be the stimulus that leads to the net being extended in your direction — either directly by the CAP or through a combination of CAP, telephone companies and maybe even cable television lines.

Many net managers rely on their primary long-distance carrier to purchase access and provide access coordination. The Big Three are promoting various types of access "diversity" to prove that their access programs are better and cheaper. Recently, MCI Communications Corp. listed MFS and TCG as two of its "access vendors of choice." (It listed all of the regional Bell holding companies, too.)

Net result: You may reap the advantage of the extending reach of CAPs even if you never deal with them directly.

➾ Rohde is associate publisher of the Center for Communications Management Information in Rockville, Md., a provider of rate and tarif information. He can be reached a (301) 816-8950, Ext. 292

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Circle Reader Service #21

MCI wins round in fight over tariff data; AT&T to appeal

BY BILL BURCH

Washington, D.C.

MCI Communications Corp. won a legal victory late last month when a federal district court judge told the carrier it can continue to file tariffs that list only ranges of rates.

The decision was a temporary setback for AT&T, which had hoped for access to details of its rival's custom network contracts. The order also created some uncertainty for companies that might have hoped to use pricing details from other companies' contracts when it came time to renegotiate their own.

However, AT&T said it would appeal the decision, and the prospects for that appeal appear good. Last November, an appeals court held that tariffs listing only ranges of rates don't meet the requirements of the Communications Act.

''We're still waiting to see what the appeals court says about AT&T's challenge to the FCC's rules, which allow a range of rates,'' an AT&T spokesman said. ''We don't think that this decision...is by any means the final word on the subject.''

In the district court order issued Sept. 24 as part of AT&T's lawsuit against MCI, Judge Stanley Harris told the two companies he would defer to the current Federal Communications Commission policy that allows nondominant carriers to file a range of rates.

Earlier this summer, the judge had told MCI it would have to file full tariffs that list rates or allow them to be easily determined, and that order appeared to be a clear victory for AT&T.

As the dominant interstate carrier, AT&T is required to file full tariffs for its services.

In particular, the tariffs cover details of custom network contracts, which gives MCI and other long-distance providers a leg up in bidding for customers' business.

But on Aug. 18, the FCC reasserted its position that nondominant carriers need only file tariffs with a range of rates, and late last month Harris removed the tariff filing requirements he had imposed.

MCI last week hailed the judge's decision. The carrier complained AT&T has been trying to stigmatize its custom network contracts as secret and illegal, and said the judge's decision should remove any taint from their filings.

Hanging over the case, however, is last November's appeals court decision overturning the FCC tariff policy. AT&T's appeal of Harris' decision may well wind up before the same court, where a similar ruling against the FCC's tariff policy could be forthcoming.

AT&T appears to be counting on such a decision. The carrier also said Harris' decision will not affect civil suits the carrier is pursuing against Sprint Corp.and other carriers for damages allegedly suffered by AT&T due to lack of access to rate information.

From the user perspective, Harris' decision creates a period of uncertainty. Companies might have been counting on being able to review similar contracts before negotiating their own deals, but access for that review will have to wait until the appeals court gets a second chance to rule on the FCC's forebearance policy. ◘

Cellular

Continued from page 32

Mass.), who asked for the GAO study, criticized this separate billing fee, saying, ''Imagine if you were charged for getting an itemized list of long-distance phone calls – it's unthinkable, but that is what is common in the cellular industry in many markets.''

Cellular customers are also getting hit with excessive per-day and per-minute roaming charges for simply using their phones away from their usual service area. The per-day roaming charge is often over $3, and with an additional $1 per-minute airtime fee, a cellular phone call can get ridiculously expensive.

Roaming charges are only justified to cover billing costs and cellular fraud losses.

Ameritech is opposed to roaming charges, which Richards said often amounts to brazen opportunism by carriers targeting users passing through another carrier's turf. But cellular service providers are forced to have reciprocal agreements with other providers, or else their customers can't make calls outside the basic service area.

The Cellular Telecommunications Industry Association estimated that revenues from roaming were $974 million in 1992, up from $704 million the previous year. But some relief may be in sight.

Southwestern Bell Mobile Systems is spearheading an effort to get carriers to drop daily roaming charges and instead provide airtime to each other at reduced rates.

Southwestern Bell argues that the time is right to drop the extra charges since most cellular providers are upgrading their networks to the Telecommunications Industry Association Standard IS-41. The standard supports hand-off of calls while roaming between systems, seamless delivery of calls between providers and pre-call validation of cellular users.

Roaming charges have only been justified as a way to cover billing costs and cellular fraud losses, said Walter Patterson, Southwestern Bell marketing director. With IS-41 technology in place, there is no longer any defense for these extra fees.

Southwestern Bell has reached tentative agreements to this effect in 361 markets – about 25% of all the cellular markets – and expects to have a pre-call validation capability in all its markets by the second quarter of 1994.

According to Leigh Wood, chief executive officer of Cellular One, which provides service in 18 metropolitan areas, the elimination of roaming charges will contribute to the evolution

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of a seamless cellular network in the country.

Other problems, such as the lack of security in cellular systems, are being tackled through use of encryption. Since April, a Boston-based start-up company called SafeCall, Inc. has offered a service for encrypting cellular phone calls, which are extremely vulnerable to eavesdropping through scanners.

A user with a mobile phone complete with a public-key encryption device dials an 800 number to the SafeCall net, which sets up the encrypted over-the-air link. Using software developed by Cycomm Corp., the SafeCall service can decrypt the phone conversation before sending it over the wireline network.

This month, the Massachusetts Bar Association began offering SafeCall cellular security service under a discount plan to the organization's 18,000 lawyers.

In spite of improvements in the current analog cellular service, in some regards the U.S. cellular industry seems to be taking a step backward. The cellular carriers can't agree on a standard for digital cellular, with some arguing for Code Division Multiple Access (CDMA) and others for Time Division Multiple Access (TDMA).

The standards battle will have serious consequences for users, as CDMA and TDMA equipment is not interoperable, except when in analog dual-mode.

But the carriers do agree on a de facto packet data standard, the Cellular Digital Packet Data (CDPD) specification developed by IBM, which is scheduled to be on-line by year end.

And CDPD is also being tested in Canada by BC TEL Mobility Cellular, the largest cellular network in British Columbia, which will evaluate the technology for Mobility Canada, a national alliance of Canadian cellular carriers.

What a difference 10 years make...

	1983	1993
Number of U.S. cellular customers	8,000	14 million
Weight of cellular phone	40 pounds	8-18 ounces
Average monthly cellular bill	$170	$40
Cost of cellular phone	$3,027	$200-$800
Number of emergency calls made from cellular phones	None	600,000 per month

SOURCE: CELLULAR TELECOMMUNICATIONS INDUSTRY ASSOCIATION, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

Compared with a cellular-switched connection, the error-checking features of CDPD promise improved delivery of facsimile, electronic mail and files. If CDPD costs are low enough, the cellular industry's next 10 years will be something to celebrate. ◼

Yacht race a test for video over ISDN

BY ELLEN MESSMER

Southampton, England

Still think videoconferencing is a newfangled service that requires fancy rooms and equipment to deploy? Consider this:

More than a dozen yachts set sail last week in the nine-month, 32,000-mile Whitbread Round the World race, each carrying BT videoconferencing equipment that is sending full-motion images via satellite and Integrated Services Digital Network links.

BT will capture the satellite video feed at points around the globe, directly relaying the signals back to Reuters news service in London via international ISDN Basic Rate Interface links.

The goal of the unusual network configuration is to prove the technical and economic viability of using 64K bit/sec satellite links in conjunction with ISDN to support videoconferencing, said Edward Scott, BT's project director.

Crews aboard the yachts — including the *Winston*, piloted by former America's Cup champion Dennis Conner — have already begun transmitting video feeds of the race through International Maritime Satellite Organization (INMARSAT) satellite receivers hooked up to BT video coder/decoders on-board.

The BT codecs are set to transmit at 384K bit/sec — the minimal speed for acceptable television-quality images — as well as the higher speed 768K bit/sec.

Satellite dishes in the U.S., the Pacific Rim and U.K. will be the touchdown points for the satellite signal, which will be piped over BRI links to Reuters in London. Switched international ISDN is the only cost-effective way to relay the INMARSAT signals.

The race will take the yachts across the Atlantic and Pacific oceans, with their progression traced through on-board global positioning receivers. ◼

China

Continued from page 32

with data traffic running at 9.6K bit/sec and higher, he added.

To widen its range of offerings, Hong Kong Telecommunications is negotiating with Chinese post, telegraph and telephone administrations to run frame relay and global-managed data services on its cables. The firm is also installing cross-connects and multiplexers to provide digital data services in Beijing, Guangzhou and Shanghai.

The Chinese government is also working to upgrade its data networks. The Beijing Telecommunications Administration had been running a "Chinapac" X.25 packet network since 1989 with about 5,500 terminal ports. In August, the government launched a new, 20,000-port X.25 network that serves 30 provincial capitals, along with the commercial hub of Chongqing in the Sichuan province.

To interconnect with the Chinese government's X.25 net, Hong Kong Telecommunications links via a gateway in Beijing, and is testing a second gateway in Guangzhou.

Before that second gateway connection is complete, Hong Kong Telecommunication's ties with China will be strong. About 40% of the company's total network traffic goes to China, mostly to the south, and the amount of traffic heading to China is growing at 35% per year. ◼

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Circle Reader Service #36

CLIENT/SERVER APPLICATIONS

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Cognos forms client/server unit, launches new tools

Axiant tools designed to build enterprise net apps.

BY BOB BROWN

Orlando, Fla.

Cognos, Inc. this week will move beyond its core fourth-generation language development tool business when it announces a new line of Windows-based software for building client/server applications.

Cognos' new Axiant software will let users build applications that can be partitioned across multiple client and server computers, and provide access to multiple databases from a single desktop system.

Axiant will be designed and marketed by a newly formed Cognos organization dubbed the Client/Server Tools Business Unit, which will be officially announced with the software at the Cognos Directions '93 user conference here.

While Cognos does not have a great deal of client/server experience, it has helped users roll out enterprise applications using its PowerHouse 4GL software, said Hans Galldin, Cognos' marketing director.

PowerHouse 4GL can be used to build client/server applications but only server-centric ones, Galldin added.

The Axiant development environment will consist of desktop Windows-based software used to design applications and an object-oriented data repository that contains the information manipulated by the developer's computer. The repository can run on any server platform, Galldin said.

The software will enable users to build basic programs and forms by pointing and clicking on screen icons. All application logic is defined using a nonprocedural scripting language.

The client software will include a personal computer database against which applications can be designed and then translated to other databases if necessary. Cognos officials declined to identify the database being used until a later time.

The object repository, initially based on Cognos technology but possibly to be replaced by other vendors' object databases, will contain forms, logic and data dictionary information, Galldin said. The repository will contain basic process models that will allow certain checks to be made on all applications developed, while developers will also be able to add rules to the repository to adjust the process models.

See Cognos, *page 43*

Cognos miniprofile

Based:	Headquarters in Ottawa; sales, service and marketing in Burlington, Mass.
Founded:	1969
Employees:	1,000
1993 revenue:	$147.7 million (fiscal year ended Feb. 28)
Primary products:	PowerHouse 4GL application development tools, Impromptu SQL database query tools and PowerPlay executive information system software. Also resells Borland International, Inc.'s InterBase database.
Key competitors:	The Ask Group, Inc., Information Builders, Inc. and Informix Software, Inc.

GRAPHIC BY ANNE GIANCOLA SOURCE: COGNOS, INC., OTTAWA

ELECTRONIC MAIL

by David Ferris

Justifying E-mail

Most people are pretty sure E-mail is a worthwhile investment. But can they justify that?

The natural response is: Electronic mail helps us communicate better. That's true but too vague. Besides, the costs of running a mail system are quite high — around $60 per mailbox per month if you count hidden costs like a share of the underlying network, communications links, support staff, etc. What's more, people waste a lot of time using E-mail, reading pointless carbon copies for example.

Some E-mail benefits are tangible, yet it's hard to attach dollar figures to them. In particular:

■**Better decision making.** Because it's easier for information to be disseminated, better decisions are made. Some decisions are big ones and the results can be substantial.

E-mail also makes people with special skills more accessible. Case in point: You remember a conversation you had three years ago with someone in the know on a particular topic. E-mail makes it much easier to track the person down and fire off a quick question.

■**Faster cycle times.** Teams can work together more quickly, which translates into faster product design, faster correction of errors, faster delivery, smaller inventories and so on.

■**Market and competitive information.** Some companies filter news feeds for information on competitors and the market.

■**Faster reactions.** E-mail helps groups — especially geographically dispersed work groups — respond quickly to sudden needs and emergencies.

■**Bulletin boards.** Fast-changing information, like manufacturing manuals or price lists, can be stored on a bulletin board system and made available much more quickly and cheaply.

E-mail can also aid in distributing reports, which arrive quickly and in a digital form that makes them easier to process.

■**International communications.** People separated by time zones find E-mail a natural and timely way to communicate.

But what about benefits that are more immediately amenable to a rigorous financial analysis? Several are based on interpersonal messaging and interpersonal file transfer.

For example, E-mail helps cut facsimile costs. Sending documents by E-mail instead of fax cuts transmission costs by 90% to 95%, a figure that includes savings in fax operator time. Another benefit is that arriving documents are in revisable form.

Messaging can also cut courier costs. Geographically separate project groups need documents sent quickly as deadlines approach. This can get very expensive, particularly if you miss a carrier's pickup time. E-mailing files is by far faster and cheaper.

See E-Mail, *page 40*

BRIEFS

IBM has announced the shipment of FlowMark, an object-oriented work flow management system that enables users to define, automate and execute business processes across a network (*NW,* Aug. 23, page 1). FlowMark consists of software for building applications and a run-time component for supporting those applications in operation. The software will initially be available on OS/2 2.1 but later will be available on AIX and other local-area network operating systems. FlowMark will cost $200 per end user and $12,000 per server.

DaVinci Systems Corp., a Raleigh, N.C., electronic mail software vendor, this week will announce wireless support for its Novell, Inc. Message Handling Service eMail software. DaVinci has teamed up with RAM Mobile Data and Business Networks, Ltd. to add wireless capabilities to its software.

DaVinci: (800) 328-4624.

Andyne Computing, Ltd. is shipping Andyne PaBLO, a reporting tool that allows end users to query multidimensional summary data stored in relational and legacy databases. The software runs on Macintosh computers and provides a point-and-click interface for accessing summary data.

Andyne PaBLO contains a data access and storage utility that lets information systems administrators collect summary data from a variety of data sources and store it in relational databases, file servers or desktop machines. The software costs $695.

Andyne: (613) 548-4355.

Lotus Development Corp. last week began shipping Lotus Notes DataLens for Windows, a set of drivers that allow Notes users to access a variety of external databases. The software includes drivers for dBASE III Plus, dBASE IV, FoxPro 2.0, OS/2 Database Manager 1.3, Informix-OnLine, Informix-SE, Oracle 6.0, Paradox, Microsoft Corp. SQL Server 4.2 and Sybase, Inc. SQL Server Version 4.2. The software is free for all licensed users of Lotus Notes.

Also, Lotus recently announced shipment of Lotus Notes 3.0 for SunSoft, Inc.'s Solaris 1.1 systems. The product supports Windows, OS/2, Macintosh and X terminal clients running Notes 3.0. It uses the Motif interface and supports the Transmission Control Protocol/Internet Protocol. It costs $495 for each license.

Lotus: (800) 346-1305.

Galileo pack lets users book flights, other travel needs

BY WAYNE ECKERSON

Rosemont, Ill.

Galileo International is prepping a graphical version of its Apollo computer reservation system (CRS) that lets personal computer users become their own travel agents letting them book flights, hotel rooms and rental cars, among other things.

Called Personal Apollo, the software gives PC users dial-up access to the Apollo CRS, which contains information about 600 airlines, 40 car rental chains and 26,000 hotel properties worldwide, as well as third-party transaction systems owned by hotel chains, car rental firms and frequent-flier programs (see graphic, page 43).

Apollo is the U.S. portion of Galileo's global CRS, which serves more than 30,000 travel agencies worldwide.

David Grossman, marketing manager for Personal Apollo at Galileo, claims Personal Apollo offers more functions and is easier to use than a PC-based CRS package offered by American Airlines' Sabre CRS. Personal Apollo offers an event-driven graphical user interface that eases navigation of the Apollo CRS and a response time of two seconds or less for users dialing in using 2,400 bit/sec modems.

This is a radical departure for Covia and most other CRS providers whose systems are typically driven by mainframes and require users to learn arcane commands and master terminal-host sessions.

When the product debuts in the first quarter of next year, it will run on DOS, Windows and Macintosh PCs. Besides dialing in directly, subscribers of value-

See Galileo, *page 43*

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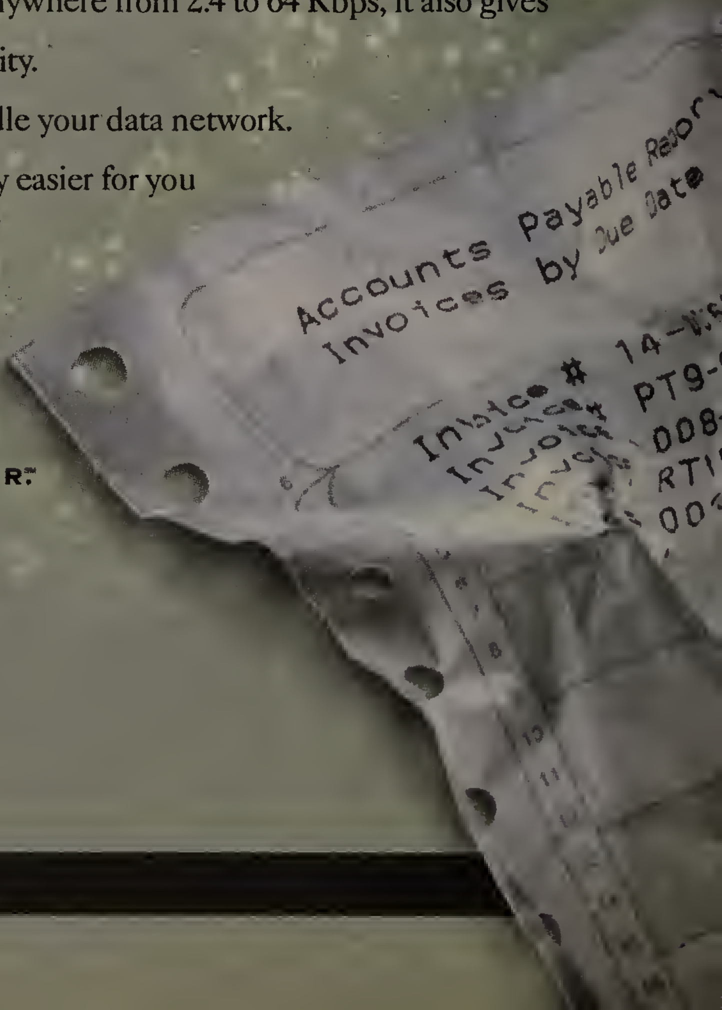

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LAN segment of E-mail market outpaces industry

BY BOB BROWN

San Francisco

The local-area network-based electronic mail market is the only segment of the E-mail market growing rapidly, according to a new survey by the "Ferris E-Mail Analyzer," a newsletter based here.

Lotus Development Corp.'s cc:Mail and Microsoft Corp.'s Microsoft Mail dominate the LAN E-mail market, while other personal computer LAN products have failed to make much of a dent, the survey finds.

Mainframe E-mail packages still represent more than half of the overall market, but growth is static, while minicomputer mail system sales are falling and Unix mail systems are creeping upward.

Examining market shares in the industry is significant for users evaluating products for enterprise E-mail nets, said David Ferris, editor of the newsletter. Market share is typically an indication of how many E-mail-enabled applications are on the market, a vendor's development resources and the availability of skilled consultants that know how to work with the product, he said.

Users are moving to LAN mail systems to leverage less-expensive and easier-to-use computer platforms, Ferris said. The fact that IBM dropped support for its Professional Office System (PROFS) in March has also accelerated the move to LAN E-mail systems, he said.

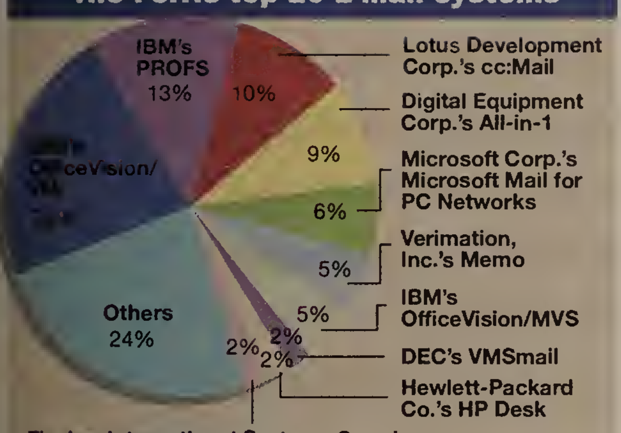
Lotus' cc:Mail has about 48% of the LAN E-mail market and about 10% of the overall E-mail market, where it is trailing two IBM mainframe E-mail packages, OfficeVision/VM (22%) and its predecessor, PROFS (13%). Those figures are based on a survey of 100 user organizations with a combined 1,041,935 mailboxes.

Microsoft Mail for PC Networks has 29% of the LAN E-mail market and 6% of the survey base, according to Ferris. Da Vinci Systems Corp. has garnered about 6% of the LAN E-mail market mainly on the strength of sales into smaller organizations, he said.

Companies to watch in this space are Novell, Inc. with its NetWare Global Message Handling Service (MHS) offering and WordPerfect Corp. with WordPerfect 4.0, he said.

©Ferris: (415) 986-1414.

The Ferris top 10 E-mail systems



Figures are based on 1,041,935 active mailboxes at 100 user organizations.

GRAPHIC BY ANNE GIANCOLA

SOURCE: "FERRIS E-MAIL ANALYZER," SAN FRANCISCO.

Microsoft brings object technology to the mainstream

BY WAYNE ECKERSON

Boston

Microsoft Corp. last week underscored its commitment to distributed object computing by sponsoring an OLE 2.0 showcase in which two dozen independent software vendors (ISV) demonstrated OLE-enabled applications.

Held in Boston and Palo Alto, Calif., the OLE 2.0 Applications Showcase was intended to exhibit the viability of Microsoft's Object Linking and Embedding technology and build momentum among users and ISVs for Microsoft's vision of the future of application development.

Microsoft officials touted the notion of component software in which developers piece together custom applications by integrated coarse-grained objects — or applications — from a variety of vendors using OLE 2.0 technology. Future releases of OLE will enable developers to link these applications across enterprise networks.

ANALYSIS

"OLE 2.0 shows our architecture and view of the future," said Microsoft Vice President Jonathan Lazarus, who hosted the OLE 2.0 showcase. "It leads the way to Windows objects and makes the idea of component software a reality."

JOHN THOMPSON

OLE 2.0 applications showcase

The significance of OLE 2.0 rests far beyond its current capabilities, which essentially allow users to integrate multivendor Windows applications within a single desktop machine. Most importantly, OLE 2.0 contains the fundamental object model that Microsoft will embed in future versions of its Windows and Windows NT operating systems, known respectively as Chicago and Cairo.

OLE 2.0 supports many of the same front-end and back-end interfaces that will enable application developers to build distributed versions of their existing applications under Cairo. Microsoft is trying to build support for Cairo by releasing portions of the technology incrementally and giving users and developers plenty of lead time to absorb and incorporate the technology.

OLE 2.0 contains a lightweight remote procedure call (RPC) to connect OLE objects residing on the same desktop machine or file server. In Cairo, Microsoft will substitute that lightweight RPC with a full-blown RPC based on the Open Software Foundation, Inc.'s Distributed Computing Environment. This provides the communications glue that will link objects across a network.

JOHN THOMPSON

LAZARUS

Consequently, developers will be able to automatically turn their stand-alone applications into distributed ones, according to David Seres, OLE 2.0 product manager at Microsoft.

In addition, Cairo will have the intelligence to manage existing links between objects, which is critical for supporting distributed OLE capabilities. This will enable users to change the location of objects or applications from one machine to another without forfeiting OLE links. In addition, it will let users embed remote objects within desktop applications, allowing them, for example, to run complex calculations within their spreadsheet on a more powerful processor elsewhere on the network. .

The OLE 2.0 Applications Showcase provided a glimpse at the kind of integrated application functionality that in the next few years will be distributed across a network.

The showcase highlighted OLE-enabled applications used by four fictional companies in different industries. Each demonstration showed how OLE 2.0 could be used to integrate applications from different vendors.

For example, one demonstration showed how a packaged-goods manufacturer could use OLE 2.0 to pinpoint the causes of a sudden drop in market share for its leading brand of coffee. OLE 2.0 enabled a fictional analyst to create a compound document examining market trends using Information Resources, Inc.'s multidimensional database, Microsoft Word 6.0 and Shapeware, Inc.'s Visio business and drawing program.

The demonstrations highlighted the major features of OLE 2.0, including the ability to drag and drop an object from one application to another and the ability to trigger actions in one application using macros developed in another.

To date, Microsoft has shipped 4,000 OLE 2.0 software developers' kits to ISVs. Microsoft has also shipped beta kits for a Macintosh version of OLE 2.0 to more than 250 ISVs. It has also licensed OLE 2.0 to several Unix software vendors that may build OLE capabilities into certified versions of Windows that run on Unix, Microsoft's Lazarus said.

©Microsoft: (800) 227-4679.

E-mail

Continued from page 38

The cost-cutting benefits of E-mail also extend to the mail room. Most companies have one mail room person per 100 to 150 employees. E-mail typically reduces the number of required postal workers by 25%.

But E-mail's greatest value arises from applications that rely on messaging as a transport.

Administrative forms routing stands out as a way of getting high returns with low investment. Organizations spend a lot of time filling out forms and routing them from person to person. These can easily be automated, using products such as Delrina Technology, Inc.'s FormFlow, JetForm's JetForm, Microsoft Corp.'s E-Forms, and WordPerfect Corp.'s InForms.

Many companies can achieve savings of 1% to 2% of revenues by automating their main paper forms. This typically increases profitability by 10%.

Time sheet systems — which record how employees spend their time — are a common example. An investment of around $50 per user per year will often result in net savings of $250 per user per year.

So when it comes to justifying E-mail, don't just think about interpersonal messaging. Forms routing is an excellent place to start.

➡ Ferris is president of Ferris Networks, a San Francisco-based E-mail research firm. He writes a monthly newsletter titled, "Ferris E-Mail Analyzer."

Help desk

Continued from page 2

duplexed hard drives by extending that protection down to the server level.

Installing SFT III is a little more involved than 3.11, but if you need the ultimate in fault tolerance it is worth it. Unlike NetWare 3.11, SFT III operates at two layers: IOEngine and Mirrored Server Engine (MSEngine). IOEngine is where the network card and hard disk controller drivers are loaded; MSEngine is the layer that makes two servers appear as one.

Another important difference between NetWare 3.11 and SFT III is SFT III does not currently support NetWare Network File Systems (NFS), Transmission Control Protocol/Internet Protocol, NetWare for Macintosh or NetWare for SAA.

Running SFT III is also more expensive than 3.11. Your server investment is doubled because you need to have two network servers for fault tolerance. You also need to purchase two Mirror Server Link (MSL) cards, which enable communication between the two SFT III servers. The MSL cards cost between $1,000 and $2,000 each. However, you only need one copy of SFT III.

Another point to consider about SFT III is when your primary server goes down and your secondary takes over, your print services are not transferred to the second server. Novell's recommendation is to run PSERVER.EXE on a stand-alone personal computer so that print service will not be interrupted if this happens.

It is important to select hardware that is on Novell's tested list for SFT III. SFT III is more demanding on the hardware due to the added load of interserver communications.

On a separate front, in SFT III, each server should have its own uninterruptible power supply (UPS); sharing a UPS is not worth the risk of a UPS failure taking down both servers.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

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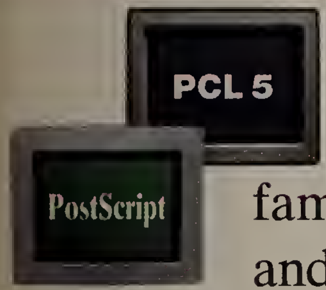

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Galileo

Continued from page 38

added networks (VAN) such as Prodigy and CompuServe will also be able to access the Apollo CRS via a special VAN version of Personal Apollo, Grossman said. Galileo is currently negotiating with a wide-range of VANs to support the service.

In a recent press briefing, Galileo officials demonstrated the point-and-click interface of a production version of Personal Apollo. Company officials used the service to check the status of incoming and outgoing flights at Chicago's O'Hare Airport. They also used Personal Apollo to determine the lowest fares for flights going between two cities on a particular day. They were able to review the seating plan of that flight, reserve a seat and order a ticket.

They selected a hotel based on predefined criteria, such as vicinity to the airport or a particular part of town, and booked a rental car and checked frequent flier accounts on United Air Lines.

Personal Apollo was able to execute transactions against the host CRS in two seconds or less using a 2,400 bit/sec modem. To achieve these response times, Galileo has installed a token-ring network in its Denver data center to act as a front-end to CRS hosts. The servers on the local-area network perform load balancing, data translations, buffering, security and other functions that ease and streamline access to the mainframes.

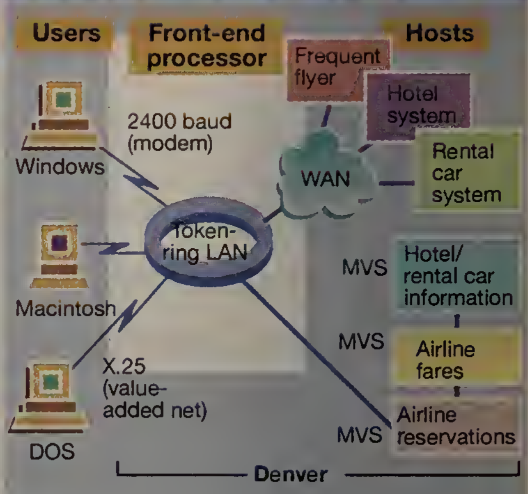
On the PC side, Personal Apollo minimizes connect time fees by letting users input all travel arrangements before the dial up link is established.

Grossman said that Personal Apollo will be a boon to travel agents, even though many users will purchase Personal Apollo to bypass travel agencies. Grossman said he expects many agencies to replace their current Apollo terminals with Personal Apollo to allow them to train new agents more quickly.

Today, it takes new agents two months to learn the system and seven months to become proficient with it, Grossman said. Personal Apollo will cut that time significantly, allowing new agents to become productive more quickly. Since the CRS companies pick up the tab of CRS training, they would also save untold millions of dollars from widespread deployment of Personal Apollo, he said.

©Galileo: (708) 518-4139

Apollo comes down to earth



Galileo's Personal Apollo will allow PC users to book flights, rental cars and hotel rooms. Users dial in to a token-ring LAN in Galileo's central data center, which routes requests to the appropriate hosts and performs load balancing and data translation.

GRAPHIC BY ANNE GIANCOLA

SOURCE: GALILEO INTERNATIONAL, ROSEMONT, ILL.

Cognos

Continued from page 38

Among the key features of the repository is that it is accessible to teams of developers. Large-scale applications typically require the work of developer teams, not just individuals.

Axiant is designed to let developers deploy applications in three tiers — presentation layer, application logic and data access logic — across different computers. The application can be partitioned based on the nature of the application and the user's network infrastructure.

Users will be able to deploy applications developed with Axiant on Windows and Apple Computer, Inc. Macintosh clients, as well as terminals.

Servers that will be supported include Unix systems from Data General Corp., Digital Equipment Corp., Hewlett-Packard Co., IBM, The Santa Cruz Operation, Inc., and Windows NT and IBM's Application System/400 in future editions of the software.

Databases supported will initially include Borland International, Inc.'s InterBase, Microsoft's SQL Server and Sybase, Inc.'s SQL Server. A later version of Axiant will support databases from HP, IBM and Oracle Corp.

Applications designed with Axiant will be able to run over networks supported by the users' database connectivity software.

Axiant will run on client computers based on Intel Corp. processors and servers running Unix, DOS and Digital Equipment Corp.'s VAX/VMS. Later, server support will be added for the IBM AS/400 and HP's MPE iX.

Axiant will cost between $3,000 and $5,000 per developer, while the run-time version will cost $1,000 per user. The software will be in beta test in the fourth quarter and generally available by June.

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NWR1

Circle Reader Service #4

Editorial

If you've been keeping up with the press, you know new IBM CEO Lou Gerstner has taken flack for a remark he made at a July meeting. "There's been a lot of speculation as to when I'm going to deliver a vision," he said. "The last thing IBM needs right now is a vision." Ah, the vision thing again.

Critics howled that Gerstner was giving short shrift to a vision of a new IBM — a vision to motivate employees weary of bad news and reassure customers leery of the future. That view may have resulted from taking the comment out of context. Gerstner was emphasizing, quite rightly, the need for immediate, decisive actions to turn IBM around.

Still, the comment reflects a mind-set that's dangerously easy to adopt — that action takes precedence over reflection in achieving goals. The truth is that a strategic plan — vision married with tactics — is the key to success.

That truth was really brought home to me at an off-site editorial meeting a couple of weeks ago. One of the highlights of the meeting was a roundtable discussion featuring the CEO of a top network company, a consultant and a network manager.

The three didn't agree on everything, but one message they shared was that users have to take charge of their network destinies. Without a strategic plan, there is no way for a network manager to meet the seemingly irreconcilable demands of doing more while spending less.

The CEO said it most succinctly: "Customers need to have the vision, not vendors. Otherwise, they'll fall prey to vendors' visions du jour." Too many network executives are relying on vendors to tell them how to pull everything together and make technology pay off for their companies, said the CEO, whose company is busily pushing its own integration vision.

The point has been hammered home in reviewing the entries for our 1993 User Excellence Awards and stories about past winners. The companies couldn't be more diverse but they all have strategic plans.

Virtually all of the really interesting user stories we encounter start off the same way: Company X faces a problem and maps out a technology plan that resolves the problem and positions the company for new opportunities that weren't envisioned when the plan was drafted.

To my mind, the single most important thing a network executive can do is drive the process of strategic technology planning. You've heard it before, but it bears repeating. It's the best job security I can think of.

➻ JOHN GALLANT

Teletoons

FRANK AND TROISE

Nobody loved mainframes the way he did. He would have wanted it this way.
R.I.P.

THE BLUE VIEW

by Anura Guruge

IBM's strategy opens road to multiprotocol networking

In mid-July, IBM dove into the nascent Asynchronous Transfer Mode (ATM) market with uncharacteristic haste and quite a splash. In a grandiloquent announcement, IBM deemed its ATM initiative to be as far-reaching and incisive as its epoch-making S/360 and Systems Network Architecture.

For IBM to compare its ATM effort to SNA was to be expected. But for IBM to put ATM on the same plateau as the S/360 is indeed thought-provoking. The S/360 family, announced in 1964, has profoundly influenced computing and is still the basis for IBM's host computers. IBM's ATM offerings have a lot to live up to.

IBM's ATM offerings cover much of the ATM spectrum, ranging from a Very Large Scale Integration-based, 8G bit/sec ATM switching chip to a multigigabit Transport Network Node (TNN) for implementing private ATM wide-area networks. IBM's initial ATM products address the desktop, campus and WAN scenarios. Support is provided both for private ATM networks built around TNNs and networks that use public ATM offerings.

Value-added services for ATM-based networks are addressed through yet another IBM networking architecture — Broadband Network Services (BNS). BNS is devoted to high-speed, multimedia networking. A key facility of BNS will be the ability to use variable-length packets within TNN-based ATM networks, in addition to the conventional 53-byte ATM cells.

Variable-length packets could be more efficient for certain SNA-based legacy applications than ATM cells. Many users will want to continue to use these legacy applications at sub-45M bit/sec speeds. At such speeds, the overhead of breaking up the 2K-byte "packets" some SNA applications use into 53-byte cells is such that users will be better off being able to use larger "packets" than the standard ATM cell.

This will always be the IBM twist — ensuring the optimum support for legacy applications.

IBM's personal computer and workstation ATM adapters, and the firm's ATM interface to the 8250 Multiprotocol Intelligent Hub it sources from Chipcom Corp., are scheduled to be available by mid-1994. However, IBM has not stated what software will be required to support ATM on the PCs and workstations. This is a curious omission. For all its promise, ATM is but a Layer 2, data link level technique that requires higher level software to drive it. Without such software, the ATM adapters are impotent. IBM will have to extend some of its workstation software, most likely OS/2 and AIX, to support these ATM adapters. The lack of this software offers a clue to IBM's ATM timetable.

IBM, quite rightly, is positioning ATM as a post-1994 technology for transforming enterprise networking. ATM is to provide a cost-effective and scalable networking fabric that will permit efficient integration of legacy SNA networks, today's local-area network-oriented multiprotocol internetworks and emerging frame relay networks.

ATM is the ultimate, high-bandwidth solution for the key networking problem now facing IBM users: the seamless integration of their legacy networks and emerging LAN/WAN internetworks into a multiprotocol, bandwidth-on-demand backbone that will also support next-generation multimedia applications. ATM is a component of the next generation of multiprotocol networking methodologies that will evolve from the 6611 bridge/router, 3745 frame relay and AnyNet solutions IBM offers today.

IBM's next-generation networking solution, in which ATM is to play a pivotal role, revolves around the network type-independent computing model postulated by IBM's Networking Blueprint. The other technologies involved are: High Performance Routing (HPR), previously known as APPN+; Dependent LU Support (3270 support relative to HPR); AnyNet; and frame relay.

IBM has a migration path, the Road to ATM, that embraces both SNA and non-SNA users. This path is comprehensive, though convoluted, and involves a potent witches' brew of emerging IBM technologies such as HPR, Dependent LU Support, AnyNet and frame relay.

Each step of this path takes users to the next evolutionary phase of realizing multiprotocol networking. It will be possible for users to traverse this path at their own speed and, if necessary, to stop and standardize at an intermediary stage. Users will also be able to implement ATM solutions, which could still include IBM's desktop and hub products — independent of IBM's strategy — by using ATM offerings from carriers or other bridge/router vendors. Thus, on the whole, IBM's Road to ATM is an open, well-balanced and feasible strategy.

This strategy should appeal to large IBM users that have to continue to nurture their legacy applications. However, it is based on a series of unproven and, as yet, undelivered technologies. Any stumbles from IBM along this path will delay the Road to ATM

Users will always have the option of pursuing other ATM offerings. The key issue is whether these other offerings will be as effective as IBM's relative to legacy applications. There is insufficient information to answer this question today — the technologies involved are just emerging.

IBM users may adopt the same wait-and-see attitude toward ATM that they had adopted toward embracing bridge/routers (*NW*, Aug. 16, page 36). There is no doubt that the technology has considerable merit. However, users are not going to rush to it until the technology is stable and the economics are compelling.

The enduring success of S/360 and SNA can be attributed to their breadth of applicability, flexibility and scalability. These attributes also apply to IBM's ATM strategy. S/360 and SNA were also trailblazing pioneers. By jumping into the fray this early, IBM's ATM strategy and products have also become pioneers. This is good, since given the complexity of its Road to ATM, IBM is going to need some time to refine its ATM strategy so it will be ready when users are ready to give it a shot.

➻ Guruge is an independent consultant specializing in internetworking and IBM network architectures. He writes extensively, presents seminars worldwide and can be reached at (603) 878-1303 or via Internet/MCI Mail at aguruge@mcimail.com.

USER FORUM

by David Bernard Ciolkowski

Novell: Improve customer support

Before Novell, Inc. attempts to develop a clear strategy for the future (*NW*, Sept. 6, page 1), the company should rethink the way it currently does business. Specifically, Novell needs to revise its customer support system for NetWare to bring it in line with users' real needs.

NetWare customer support is atrocious -- mainly because Noorda & Co. directs end users to their value-added resellers (VAR) for the first line of support. There are two problems with this approach.

First, by off-loading first-line support to VARs, it is difficult for Novell to manage the quality of customer support. Although some VARs may offer excellent support, many cannot afford the resources needed to provide quality support in a timely manner. Small VARs often share a Certified NetWare Engineer (CNE) or have a CNE associated with them on a part-time basis. In these cases, the level of support is not sufficient for a mission-critical local-area network.

Second, users that purchase NetWare via mail order or from a VAR that does not have a customer support department are out of luck — or have to resort to fee-based telephone support from Novell. This is expensive, costing $150 per incident.

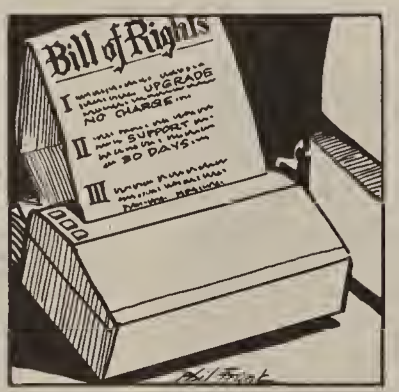
The way Novell handles documentation is also indicative of its careless attitude toward customers. NetWare documentation is disorganized, incomplete and often confusing.

Shrink-wrapped packages of NetWare 3.11 contain the original set of files, without any updates. Until recently, Novell provided only two methods for users to obtain current update files: via the NetWire forum on CompuServe (charging the user's account) or from their VAR. If the VAR didn't have sufficient customer support, it could take quite a while for the user to receive the necessary update files.

When I needed a software update, I called Novell and addressed my complaints up the ladder. I got what I needed, but only after spending half a day on the phone.

During one such call to Novell, a Novell technician explained why support is "structured" this way. He said NetWare was never intended to be sold "off-the-shelf," only through integrators.

This philosophy is outdated; it ignores the group of NetWare customers that don't use integrators. This group, in effect, is punished by Novell for choosing a Novell product.



Just recently, Novell started a bulletin board for file updates. The number is (408) 649-3443 at 2,400 bit/sec or (408) 649-3696 at 9.6K bit/sec. It's about time.

There is a basic level of customer service that users deserve. As consumers in the information age, we have the right to:

■ Bug-free software. Maintenance upgrades should be sent next- or two-day air to registered users of the base version at no charge. Public bulletin boards are also a cost-effective way to disseminate updates.

■ Accessible technical support telephone numbers. They should be prominently displayed in the documentation. Often, vendors hide them in unlikely places or omit them entirely.

■ Free technical support for at least 30 days, direct from the manufacturer.

■ Clear and complete documentation at no charge. This is especially important when telephone support is lacking.

■ Bulletproof Windows drivers. Font and device drivers for Windows should be tested to ensure that they do not cause the Windows environment to crash or malfunction. Once installed, these products become part of the operating system and affect the operation of other applications. Malfunction can cause serious problems.

Software manufacturers should meet or exceed the above customer support criteria to be useful players in corporate America. Anything less is unacceptable. Users that buy an application in good faith should not be treated as though they downloaded it from a bulletin board.

Where did I get these ideas? From Microsoft Corp., whose success can be attributed to its approach to customer service.

Novell's attitude is similar to that of local cable television companies that have little or no competition; it just does not seem as though Novell values its customers.

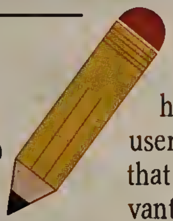
In contrast, Microsoft never seems to take its customers for granted. For example, registered users of Microsoft Word for Windows Version 2.0 were sent revisions A, B and C of the software in the mail, at no charge, without asking the company.

Microsoft provides free support for at least the first 30 days on all of its productsand takes a proactive approach to fixing bugs and distributing updates to registered users.

Perhaps Novell should stop nudging the government to levy sanctions against Microsoft for "unfair trade practices" and use Microsoft as a model for how to get its act together.

➠ Ciolkowski is director of MIS for Abrams Benisch Riker, Inc./Colliers International Property Consultants, a New York-based real estate services firm.

Letters



Refreshing view

I enjoyed Mark Gibbs' article "People shouldn't compute in glasshouses" (*NW*, Sept. 20, page 26). I'm glad someone noticed that servers (data servers, at least) are analagous to the "glasshouse" mainframe. I, for one, am getting tired of hearing about the dinosaur mainframe heading for extinction. It's refreshing to see a contrary view.

Allan Sperber
Director, MIS
Jetro Cash & Carry
New York

The price is right

The opinions expressed by Mary Johnston Turner in the column "Multimedia, ATM demand fixed-priced carrier services" (*NW*, Aug. 23, page 72) reinforce widely held misconceptions among users of communications services that are unfamiliar with the relevant pricing issues.

While it is readily apparent that users would prefer predictable bills in the absence of other choices, an overriding consideration exists in the case of Asynchronus Transfer Mode- based services vs. private leased lines. This consideration is the necessity for carriers to set private-line charges at a high enough level to defray their costs and still provide a profit.

As her column shows, Ms. Johnston Turner realizes the need to provide sufficient dedicated bandwidth to accommodate a user's peak traffic requirements in a private-line environment. If, for example, a user of private lines needs the bandwidth of a DS3 circuit (45M bit/sec) to accommodate the peak load, the charges for the dedicated circuit must be large enough to defray the cost to the carrier of providing 45M bit/sec of bandwidth to a particular user 24 hours a day, seven days a week.

Whether the user has no traffic or no more than a single voice-grade channel capacity in use at any particular time on the dedicated private circuit, the user pays the price of a DS3 circuit. This is a 100% predictable cost to the user.

The biggest potential advantage to the user of ATM technology usage-based pricing, is the ability to pay only for the bandwidth capacity used at any given moment. While the subscriber loop portion of the ATM user's connection is, of necessity, dedicated to a single user and must be paid for at a fixed rate, the portion of the total network bandwidth available that will be charged to the user is only that portion he uses at any given time.

Thus, if a user in the ATM environment needs only the capacity of a single voice circuit, that capacity is allocated to his use and the user's bill reflects only that use. But, if the user needs the capacity of a DS3 circuit for a given time period, the billing reflects the charges for DS3 capacity for only the time that bandwidth is actually used.

Therefore, while an ATM user sacrifices a fully predictable bill, he gains a bill that reflects his actual usage. Even though the user's bill may grow with time, it will potentially be lower than could be expected in a private-line environment.

In addition to the advantages of usage-based pricing of ATM services, the user also gains access to bandwidth on demand — bandwidth that can provide access to a variety of advanced communications services.

While sacrificing a fixed bill, the ATM user gains the ability to control his communications bill, actually reducing it if usage does not require high bandwidth most of the time, while also gaining access to a wide array of advanced communications services. This offers society a win-win situation, as it provides motivation for building the "information highways" that can carry the nation into the next century.

David R. Miller
Vice president
Central Associated Engineers, Inc.
Lexington, Ky.

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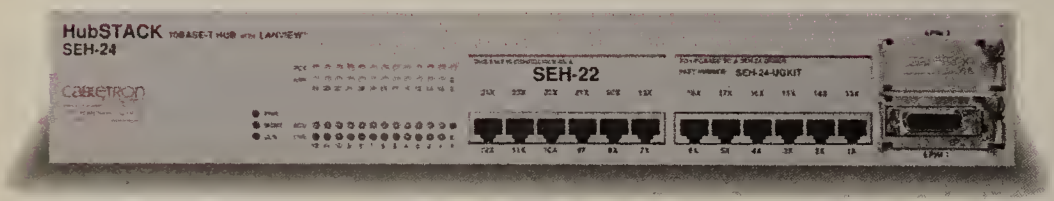

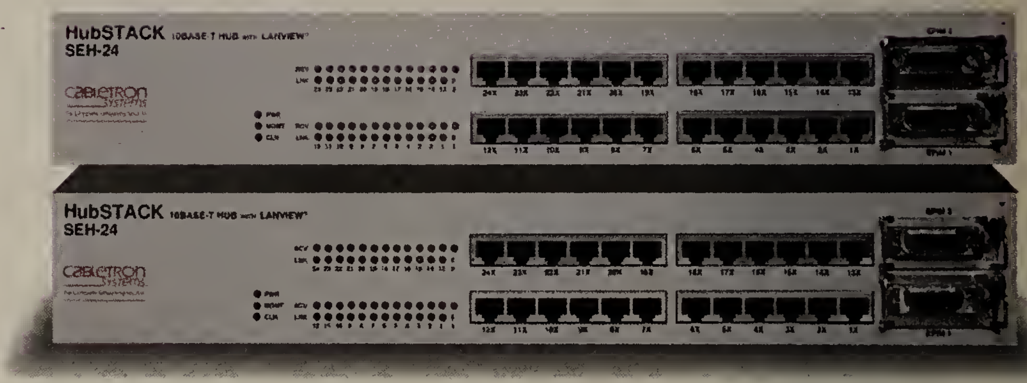

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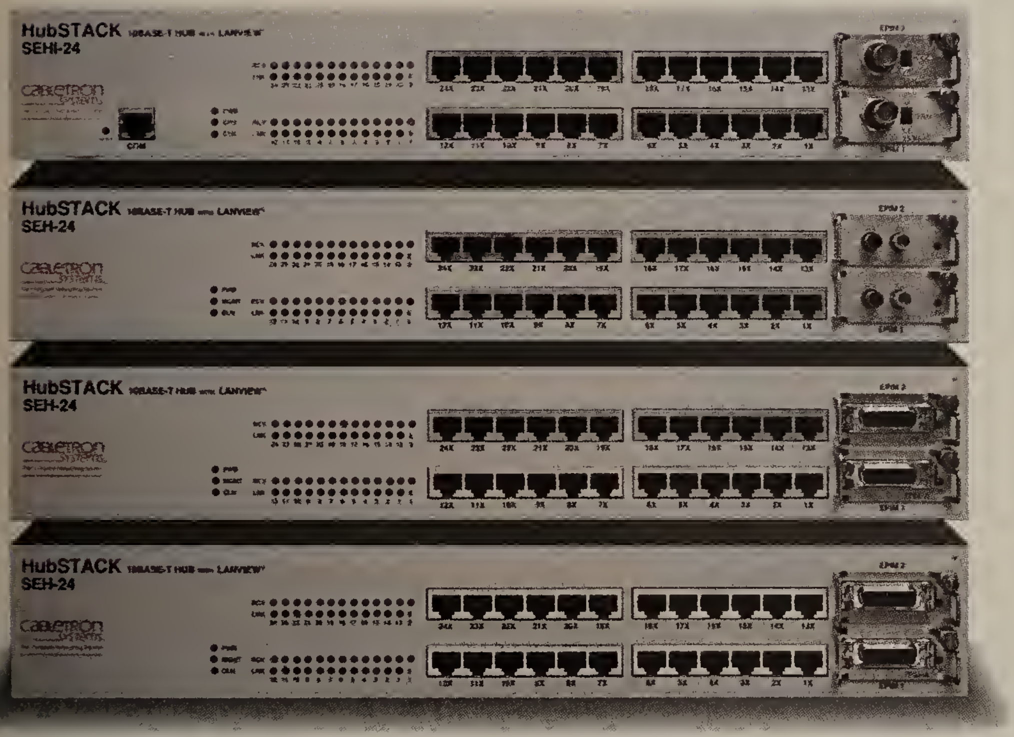

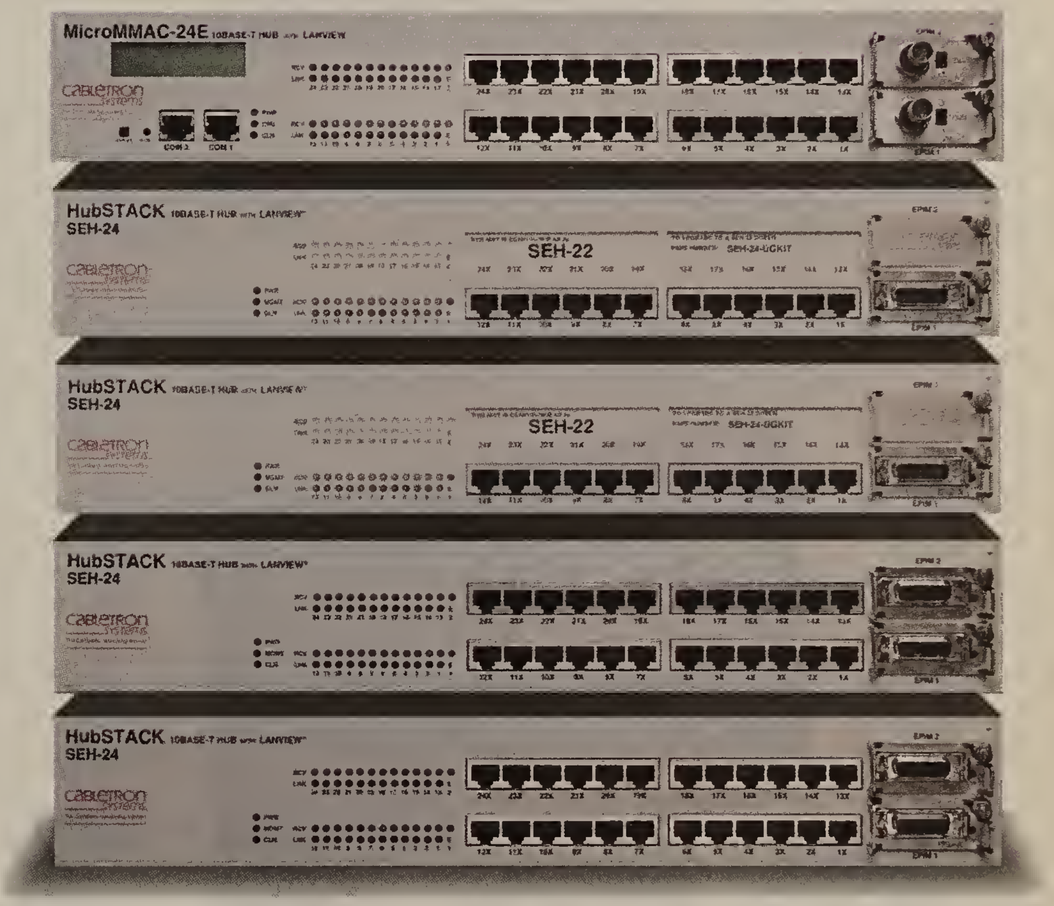

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Big Red keeps rolling

The NetWare juggernaut seems to be building momentum at a time when competitors such as Banyan Systems, Inc., IBM and Microsoft Corp. are doing their best just to keep up.

The big red Novell machine has embraced a concept labeled by Chairman and Chief Executive Officer Ray Noorda as "coopetition."

This mentality of coopetition among rivals is necessary for the future, Noorda says, adding, "We are moving toward a survival environment, and the directions will be set by those that have become the strongest."

And Novell is certainly dealing from a position of strength. The company has zero debt, and Jim Tolonen, Novell's chief financial officer, projects that NetWare sales will account for less of the company's overall revenue, with Unix and other network-related products balancing out the mix.

With regard to Unix, Noorda says Novell will deepen its commitment. "Nobody has that market yet [for 32-bit operating systems] and we want to play," he says. Novell also wants to appeal to users developing networked applications. Its nascent AppWare development strategy is aimed at capturing the hearts of users and developers. And in the story that follows, it appears Novell is well positioned to win many converts.

On the network management front, Novell is struggling. Users seem confused over the vendor's NetWare Management System (NMS). And even Novell seems to be reeling a bit, refocusing the product after a lukewarm user reception.

"Our management platform is not Windows-, Unix- or OS/2-based; it's NetWare," says Steve Dauber, product line manager for network management. "NMS has to be a distributed service on the network." And in the story on page 52, *Network World* examines Novell's plans to do just that.

Also, a European user last year unearthed a disconcerting discovery of a security loophole in NetWare 3.X. The flaw has since been addressed by Novell. Still, users can gain peace of mind by ensuring security at the server level. In the latest in a series on network operating system (NOS) security evaluations, consultant Mark Gibbs probes the passel of NetWare server-security offerings available to users.

Lastly, despite significant advances, Novell sometimes exudes the arrogance of a market king. The vendor gives the impression that some of its moves are dictated more by Novell's market position than by its customers' needs.

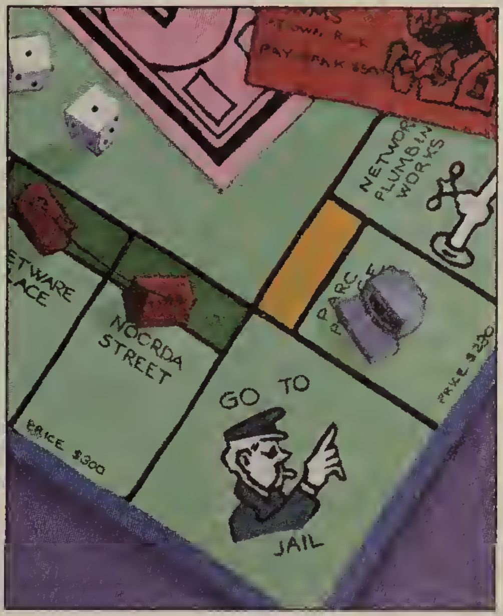
Take, for instance, the issue of NOS interoperability. Novell lags here; Banyan has taken a slight lead by serving up a product to bridge directory services on an enterprise basis. And IBM has gotten open systems religion in the form of embracing the Open Software Foundation, Inc.'s Distributed Computing Environment.

Novell insists it supports interoperability — but it does so by providing application program interfaces that competitors must support to extend their products to NetWare environments.

Novell certainly has the momentum in its favor, but if it wishes to keep the big red machine rolling, it should do what's best for customers' enterprise network needs. Novell's rewards can only follow from that course of action.

➾ CHARLES BRUNO

Novell's next move



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The big picture

Page **55**

Guarding all servers

ILLUSTRATIONS BY CAROL O'MALIA

Page **59**

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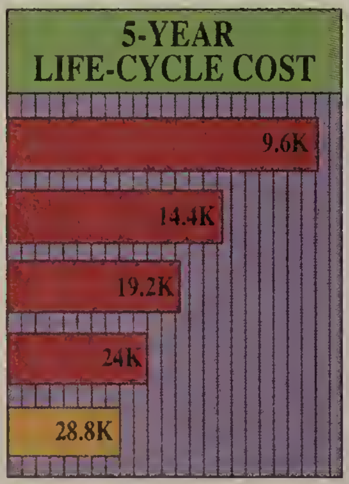

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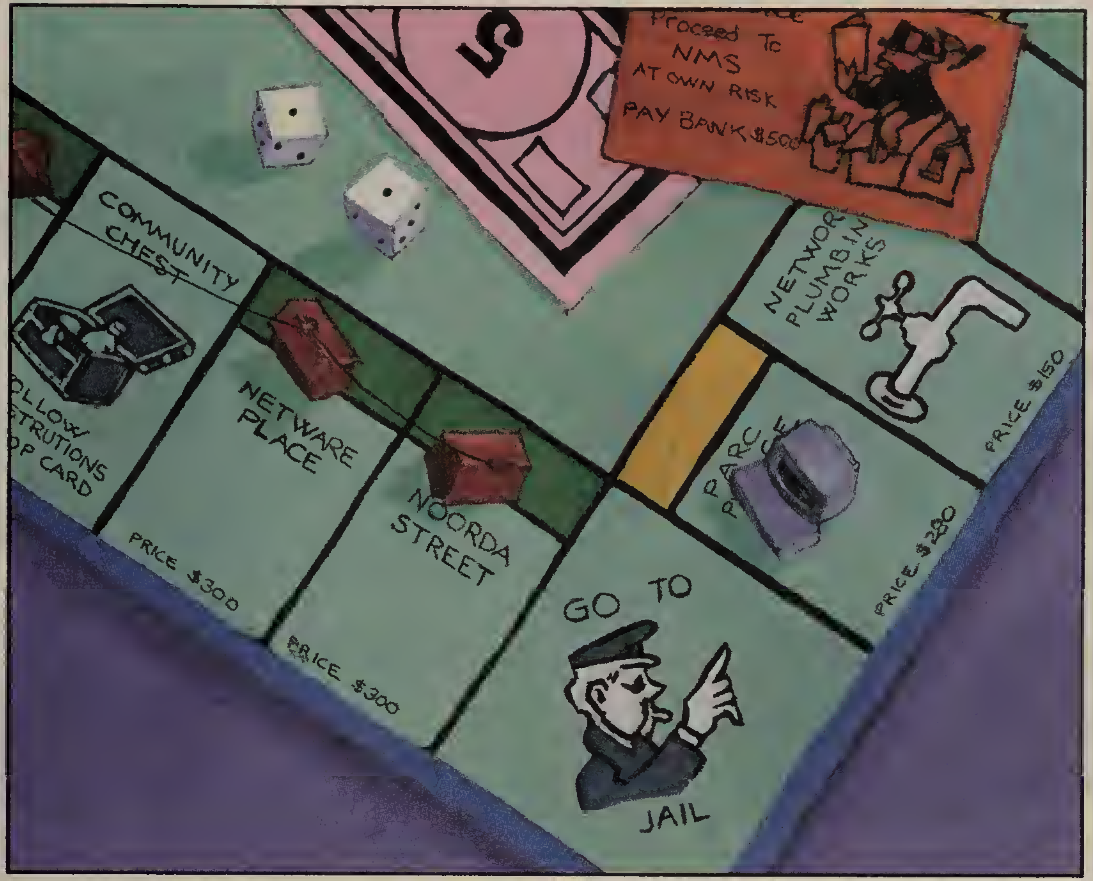
Users await Novell's next move



NetWare shops express confusion over Novell's net management strategy at a time when the vendor seems to be reassessing its plans.

BY DAVID RHODES

Despite enhancements that Novell, Inc. made recently to its NetWare Management System (NMS), users remain confused about the product's direction and how — not to mention whether — it will fit into their overall network management plans.

Novell's NMS architecture is similar to leading network management platforms in that it provides a suite of underlying services that support a range of proprietary and third-party applications. NMS is based on a proprietary management protocol, MSAPI, not the more ubiquitous Simple Network Management Protocol. That's a key concern for users embracing standards-based manage-ment.

Additionally, many managers of large, complex internetworks are puzzled about how Novell is positioning NMS; some say it's unclear if the product is meant solely to be a NetWare work group manager or if it will evolve into a full-blown manager of managers, akin to Hewlett-Packard Co.'s OpenView or SunConnect's SunNet Manager.

As it stands today, users agree that NMS lacks the functionality to be a manager of managers, but continued enhancements seem to indicate that Novell plans to position it as a full-blown net manager.

Paul Bandrowski, manager of advanced technology at Chicago-based Sara Lee Corp., uses NMS almost solely to handle NetWare servers. His firm's internetwork includes thousands of users across hundreds of small subnetworks. "I'd love to see NMS and OpenView become better integrated because OpenView is much more of a manager of managers. NMS should concentrate on managing server hardware and software components with add-ons like Compaq's Computer Corp.'s Insight Manager for SystemPro servers."

On the other hand, some network managers look to NMS as a platform suited to supporting internetwork management. They use third-party applications for NMS that provide control over Cisco Systems, Inc. routers and other internetworking devices.

Andy Kiolbasa, coordinator of end-user computing at ITT Fluid Technology Corp., uses NMS 1.1 to manage a network of 400 NetWare nodes at more than 10 locations. His wide-area network is based on Cisco routers and frame relay, and connects 16 NetWare 3.11 servers. He uses Stonybrook Services, Inc.'s Stonybrook Services Router Manager to handle his Cisco routers. "Bandwidth utilization over the WAN links is my biggest concern," he says. "The Router Manager makes it easy to double-click on a router in the map and quickly get the stats I need and make any necessary changes."

DUAL-LAYER DESIGN

Part of the confusion about NMS stems from an architecture that is similar to high-end management platforms currently on the market.

NMS consists of two layers. The underlying platform, or NMS, supports higher level applications through automatic node discovery and mapping of Internetwork Packet Exchange (IPX) and Internet Protocol devices, central alarm management, a Btrieve database and a consistent graphical user interface.

Atop that layer run applications such as Novell's NetWare Services Manager (NSM) and Hub Services Manager, both of which can share these services and provide a common look and feel for the user. These applications run on a Windows-based personal computer, while the underlying services are split between the console and the managed servers. Alarm management, for example, is still a function of the Windows-based console. The automatic discovery tool is implemented as a NetWare Loadable Module (NLM), called NetExplorer, and the agents that run on each server in the network are NLMs called NetWare Management Agents (NMA).

The bulk of functionality for the user comes not just from the few applications from Novell, but rather from the applications developed by third-party vendors. Using an NMS software developers' kit, vendors develop products that provide functionality that is specific to a certain set of hardware devices or software applications and integrate management of these components with NMS services.

For example, using Optivity from SynOptics Communications, Inc., a user can double-click on a SynOptics hub represented as an icon in the NMS locational map and launch Optivity to receive detailed information and allow configuration of the hub in question. Other popular third-party applications include Stonybrook Services Router Manager and Microcom, Inc.'s LANlord for NMS, which will be released soon and is expected to manage desktop PC and software components.

Novell recently announced NMS Version 2.0. This release not only adds more user-demanded functionality, but it also represents a shift in the overall architecture of the system. By adding critical device monitoring, address management and generic router management, Novell has addressed several common user complaints. By redesigning the system's architecture, the firm has begun to position NMS as a distributed management platform.

Among the enhancements is a generic application for managing routers via the Management Information Base (MIB) II. Previously, Novell only offered a MIB Browser utility to conduct minimal GET/SET operations. The router management application in NMS 2.0 will give users a broader range of management control over routers that support MIB II.

Other new capabilities provided by NMS 2.0 include monitoring remote devices, monitoring traffic statistics on remote local-area network segments, and tracking and assigning IP and IPX device addresses, as well as tracking their use. Additionally, Novell announced early this summer that it would eventually support SNMP and drop its proprietary MSAPI protocol. Together, these enhancements signal that Novell is trying to position NMS as a distributed platform.

On the distributed monitoring front, NMS 2.0 incorporates the functionality of both the LANalyzer for Windows product, software that monitors and graphically represents traffic on NetWare networks, and the LANtern product, a hardware-based LAN monitor.

Under NMS, LANalyzer agents run as NLMs on NetWare servers. Using the Remote Monitoring (RMON) MIB, these agents collect data from the segments to which the server is attached. The NMS console includes a services manager similar to LANalyzer for Windows, which allows the user to query and represent information from remote LANalyzer agents (see graphic, this page). A firmware upgrade will also add RMON support to existing LANtern devices, giving them the same functionality as a server running the LANalyzer agent.

Previously, NMS could monitor a server and receive alarms. But NMS had no way of knowing if a server crashed. "It's a real pain that we aren't notified when a server goes down," says ITT Fluid Technology's Kiolbasa. "I'd like to see the agents on the servers themselves do more intelligent collection and transmission of information."

Novell says it believes such distributed management capabilities are crucial for managers of complex internetworks.

"As the number of devices on the network grows, the complexity of the interaction of these devices grows exponentially," according to Steve Dauber, product-line manager for network management at Novell. "Until [the integration of remote monitoring into NMS], you had to have a hardware device directly attached to each segment to be monitored. Even then, managing the data gathered by those devices was difficult, if not impossible, from a central location."

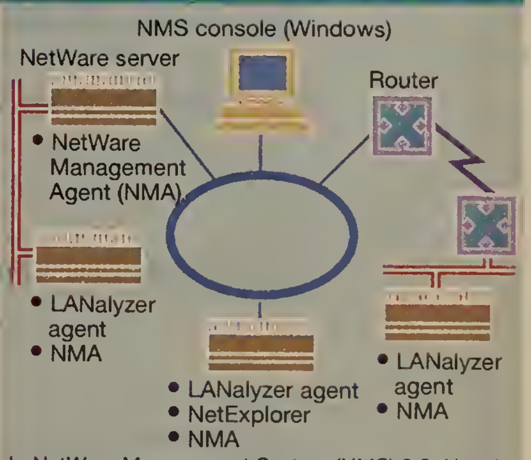
Using NMS 2.0, the network manager can be proactive rather than reactive in identifying and correcting problems on remote segments. Rather than waiting for problems to occur and then going to the site with a network analyzer (difficult at best and often impossible in remote sites), the network manager can configure each remote LANalyzer agent to send alerts when certain statistics exceed specified limits.

SNMP GAPS

Although the enhancements inherent in NMS 2.0 may be considerable, there are still some gaps that need to be addressed. Version 2.0 of the software developers' kit includes tools to develop SNMP-based management applications. Oddly enough though, NMS 2.0 does not support SNMP. The result is that current SNMP support at the software developers' kit level is useless until Novell supports NMS.

Novell has recently implied that it intends to do just that. An arrangement with Sun Microsystems, Inc. will allow SunNet Manager, a high-end Unix-based SNMP network management platform, to handle NetWare servers running NMAs. Those agents will have to be converted to support SNMP instead of being based on MSAPI. Novell plans to have the server agents completed early next year.

Policing local events in NMS



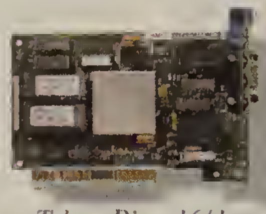
In NetWare Management System (NMS) 2.0, Novell has deployed LANalyzer agents on a distributed basis to alert the NMS console of unplanned events.

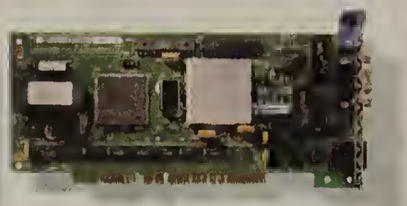
SOURCE: NOVELL, INC., PROVO, UTAH
GRAPHIC BY SUSAN SLATER

However, since these new server agents will speak strictly SNMP, a new version of the

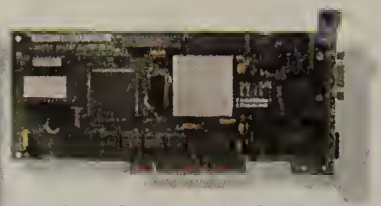
See Users, page 66

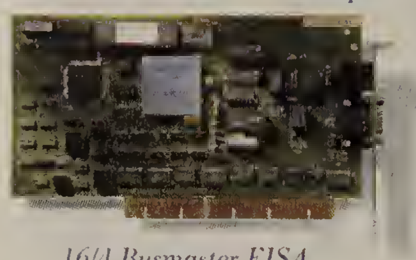
a) Token-Ring


Token-Ring 16/4 Adapter/A (MCA)

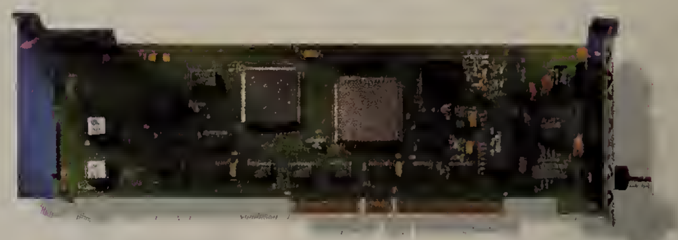

LANStreamer MC 32 Adapter

16/4 ISA 16 Adapter

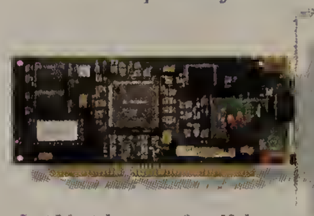

LANStreamer MC 16 Adapter


16/4 Busmaster EISA Adapter

b) Ethernet


EtherStreamer MC 32 Adapter (10BaseT/2/5, full duplex mode)

LAN Adapter/A for Ethernet (10BaseT/2/5, MCA)


LAN Adapter for Ethernet TP (10BaseT, ISA)

LAN Adapter for Ethernet CX (10Base2, ISA)

e) All of th

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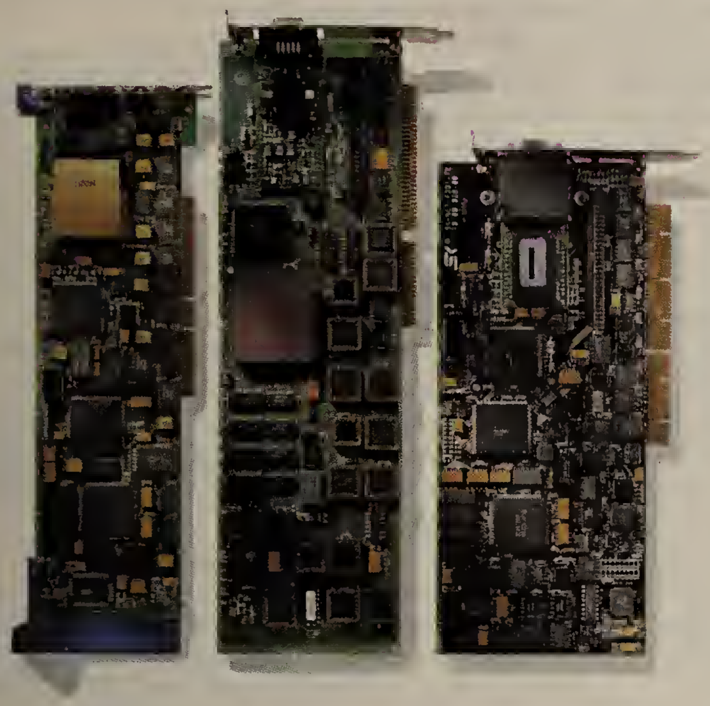

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d) PCMCIA

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The BIG picture

Although Novell's application development puzzle is still coming together, it appears the vendor can deliver long-awaited network independence.

BY JODI MARDESICH

Imagine standing in front of a blackboard, sketching out plans for a collaborative application that will give your company an edge over the competition. Such an application must run on Windows, Macintosh and Unix clients. Data must be stored in Oracle and Sybase servers in various locations on a distributed, multi-city NetWare network. As you chalk in the details, you realize that by the time you finish writing the Windows application — before you even get around to the Macintosh or Unix versions — the application will be obsolete. You wake up in a sweat with your heart pounding.

Three months ago, Novell outlined a new layer of software called AppWare as a possible solution to the cross-platform network application nightmare. With AppWare, Novell says developers can save time and effort by writing an application once, then recompiling and relinking it to run on other platforms. Users and developers can write applications using third-generation programming languages, such as C++, or fourth- or fifth-generation languages — whichever is the preferred means.

But most importantly, developers can reuse blocks of code Novell or others have created that perform network-related tasks. And AppWare isn't tied just to NetWare. Novell will support services on Unix and other network operating environments, as well.

Too good to be true? This month, Novell plans to ship the first installments of AppWare, which will offer such a powerful set of cross-platform object libraries that a developer need only construct an application once and it will run the gamut of desktop operating systems. If AppWare turns out to be everything it's cracked up to be, it will be a remarkable success in a field where many have tried but few have completely succeeded.

"If Novell can pull this off, they will have pulled off what IBM was unable to with its [Systems Application Architecture] initiative," says John Dubiel, manager of planning and technology at Boston Edison Co. SAA was supposed to shield developers from the application platform they were running on.

Novell describes AppWare as a shock absorber between operating systems and applications. It shields developers from differences between operating systems and provides a uniform infrastructure for building cross-platform, networked applications. "AppWare will bring key network services onto desktops, services that will otherwise go unsupported and unused," says Joe Firmage, vice president of Novell's AppWare Systems Group and formerly president of Serius Corp., which developed some of AppWare's core technologies.

For instance, Firmage says Novell is working with AT&T to develop an AppWare Loadable Module (ALM) — an object that provides cross-platform services — to enable desktop applications to take advantage of telephony services.

AppWare consists of several components: Visual AppBuilder, the AppWare Foundation Developer's Kit, the AppWare ALM Software Developer's Kit and the AppWare Bus ToolMaker. These provide several different levels of tools with which developers can work, and different parts of AppWare will appeal to different types of developers. All of these products will be purchased separately and will be available this month, except for the AppWare Bus ToolMaker.

Early supporters of AppWare

- ☑ AT&T
- ☑ Borland International, Inc.
- ☑ Cheyenne Software, Inc.
- ☑ Easel Corp.
- ☑ Excalibur Technologies Corp.
- ☑ Gupta Corp.
- ☑ IBM
- ☑ Imagery Software, Inc.
- ☑ Ingres
- ☑ Powersoft Corp.
- ☑ Progress Software Corp.
- ☑ Strategic Mapping, Inc.
- ☑ Taligent, Inc.
- ☑ Wall Data, Inc.

Novell is expected to announce additional support for AppWare at the NetWorld 93 Dallas conference this week.

SOURCE: NOVELL, INC., PROVO, UTAH

Visual AppBuilder, formerly known as Serius Workshop, is a graphical environment that lets users create an application using visual tools with a minimum of textual source code. With Visual AppBuilder, corporate developers, system integrators or users can see and use a palette of icons representing ALMs. These ALMs are prewritten objects that perform certain tasks across diverse operating systems, such as creating a dialogue box, calling a database server or using a directory service. ALMs are categorized into nouns and verbs. By dragging out the nouns, double clicking on them to edit their attributes and wiring up the verbs, developers can use them in new applications.

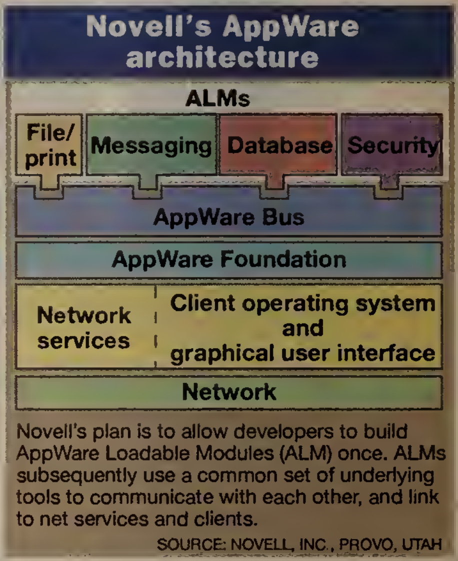
"AppWare is ambitious in that with ALMs, you have the ability to put standard network services — mail, imaging, communications — into an object abstraction, and be able to link those into your application," Boston Edison's Dubiel says.

Novell has finished several ALMs that provide such services as multimedia; serial communications; report generation; and interapplication communications, including Dynamic Data Exchange and Object Linking and Embedding on Windows and Inter Application Communication on the Macintosh. Future ALMs will include NetWare Directory Service, other directory services, document imaging and full text retrieval.

Visual AppBuilder uses the AppWare bus to link the code and the objects, and compile them into executable files for the various operating systems. The AppWare bus is a software engine that coordinates the interaction of ALMs. Visual AppBuilder comes in Windows and Macintosh versions today, and will be ported to Unix in the future.

Developers can start at the Visual AppBuilder level, where they work visually with icons, or work at the AppWare Foundation level, where they use languages such as C, C++ or COBOL. The AppWare Foundation is a set of cross-platform operating system and service libraries that work on Windows, Macintosh and Unix platforms.

Novell's AppWare architecture



Novell's plan is to allow developers to build AppWare Loadable Modules (ALM) once. ALMs subsequently use a common set of underlying tools to communicate with each other, and link to net services and clients.

SOURCE: NOVELL, INC., PROVO, UTAH

The AppWare Foundation will run on Microsoft Corp.'s NT by the end of 1993 and on OS/2 by mid-1994. Instead of writing the code for certain standard functions, developers can simply call prewritten libraries. To create a dialogue box in a Windows application, for example, developers can use AppWare's library for dialog boxes. If developers want to port the application to the Macintosh, they could replace the libraries specific to Windows with Macintosh libraries and recompile the application.

The AppWare Foundation, formerly known as Software Transformation, Inc.'s Universal Component System, also simplifies development by providing a single application program interface (API) through which code can access the range of supported operating systems, user interfaces and connectivity services. This protects the developer from having to write to multiple APIs to create a cross platform application.

When AppWare ships this October, it will enable users to develop applications that run over Network Basic I/O System Extended User Interface, Internetwork Packet Exchange (IPX) and Transmission Control Protocol/Internet Protocol nets; support for Windows Sockets will be added before the end of the year.

Novell has also said it is committed to supporting Systems Network Architecture and DECnet transports, but it has not indicated a time frame for doing so.

Novell also plans to create AppWare Foundation components for calling and using shared objects governed by object request brokers, which control how different applications call objects over a range of networked systems. Developers writing to the AppWare API will not have to be concerned with where the object services are located and which object management system they are using, as long as it supports the Object Management Group's Common Object Request Broker specification.

Another component of AppWare is the ALM Software Developer's Kit. The ALM kit will contain the AppWare Bus specification that will enable developers to create their own ALMs (see story, this page). These ALMs will then be available for new cross-platform applications.

Novell is also making specifications available — via the AppWare Bus ToolMaker — that will let commercial tool makers access the linking and compiling technology that defines how Visual AppBuilder works with ALMs via the AppWare bus.

This will let third-party vendors modify their tools to work with AppWare.

THE ALTERNATIVES

AppWare is facing off against a wide range of other development tools that claim to accomplish similar ends. Client/server development tools are proliferating and now include graphical user interface builders, class libraries and portable languages. However, most only address a subset of the capabilities Novell claims AppWare supports.

For instance, most of the graphical user interface builders, such as Microsoft's Visual C++, Visual Basic and PowerSoft Corp.'s PowerBuilder, work in the Windows environment only.

Class libraries, including XVT Software, Inc.'s XVT Portability Toolkit or Neuron Data, Inc.'s Open Interface Toolkit, allow developers to write cross-platform graphical applications, but some developers have complained that the resulting applications don't feel right on either platform.

Instead, applications built with these tools don't have the complete set of visual characteristics users normally associate with the particular platform.

"With every single tool I've seen to date that allows you to write once and build many, you end up getting this generic front end that doesn't quite look like it fits into anybody's platform," says Bill Parducci, a consultant with Sophisticated Technologies, Inc., in Tarzana, Calif.

Portable languages such as ParcPlace Systems, Inc.'s SmallTalk are most like the AppWare Foundation, developers say. "AppWare's real competition is from SmallTalk-based tools," says Paul Bandrowski, manager of advanced technology for Chicago-based Sara

See Big Picture, page 66

AppWare eases text-to-voice for one user

Some have found that the spoken word is worth a thousand written ones.

Eric Weidl, a network programmer in the University of Chicago Biological Sciences Division's Office of Academic Computing, found that with Novell, Inc.'s AppWare, adding text-to-speech translation to applications was as simple as adding an AppWare Loadable Module (ALM).

"When you first hear about it, it sounds like a gimmick, but when you start thinking about the different ways you can use a computer, you realize it could be a fabulous advancement," Weidl says. "In our labs, people have to take their eyes off the lab equipment to read a value on the screen so they know whether they should adjust something. I thought the computer could just read the the values."

Weidl used the AppWare ALM Software Developer's Kit to create the text-to-speech ALM. "It's no more difficult than writing an XCMD or a [dynamic link library]," Weidl says. Using ThinkC, Weidl wrote a wrapper around Apple Computer, Inc.'s Speech Manager, a C library that translates text into speech. With the speech element added to Visual AppBuilder's palette of icons, a power user or corporate developer could put that icon into the logic of an application, essentially adding text-to-speech capability without knowing how to program in C.

According to Weidl, AppWare saves development time and lets him focus on the logic of his application, rather than his syntax or typing skills.

Weidl looked at four other Macintosh visual application builders and three Windows tools. "The problem with the majority of those [fifth-generation languages], like Visual Basic, was that they let you develop the user interface, but you still have to go in and tweak things by hand." Besides, AppWare helps reconcile the differences in platforms and helps developers deal with memory management and objects, he says.

Perhaps the most surprising thing about Weidl's commitment to AppWare is that he's not a NetWare user. "We're committed to it, not because we have a huge investment in learning how to use it," he says. "We like it because it puts us in a competitive position and we're able to do the things people are asking us to do. We fully expect them to come out with network services for our AppleTalk and TCP/IP networks."

BY JODI MARDESICH

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February 17, 1994 Washington, DC

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Guarding all servers

Central Point, Intel products top the list in review of server-based antivirus NLMs for NetWare servers.

BY MARK GIBBS

NETWORK WORLD TEST ALLIANCE

Most users pay little attention to the use of antivirus protection inside a Novell, Inc. NetWare file server since there are no known NetWare-specific viruses yet.

With server-based antivirus products, sites stand a better chance of detecting an infected file within seconds of its transmission to a server. On an unprotected server, detection might not occur for hours or even days, by which time the virus could be costly to remove.

In a recent evaluation of antivirus software packages for NetWare servers, the National Computer Security Association (NCSA) concluded that two products — Central Point Software, Inc.'s Anti-Virus for NetWare and Intel Corp.'s LANDesk Virus Protect — offer the widest array of functions and features for protecting servers across enterprise networks. These products also stand out due to their clean designs and easy to read graphical user interfaces.

Following closely on the heels of the Central Point and Intel offerings, however, are Cheyenne Software, Inc.'s InocuLAN and Fifth Generation Systems' Untouchable Network. Although these packages lack some remote management and reporting features, they prove to be well suited to large net installations.

Vendor directory

Central Point Software, Inc.
15220 N.W. Greenbrier Pkwy.
Suite 200
Beaverton, Ore. 97006
(800) 445-4208; (503) 690-8090

Cheyenne Software, Inc.
55 Bryant Ave.
Roslyn, N.Y. 11576
(800) 243-9462; (516) 484-5110

Command Software Systems, Inc.
1061 E. Indiantown Rd.
Suite 500
Jupiter, Fla. 33477
(800) 423-9147; (407) 575-3200

Fifth Generation Systems
10049 N. Reiger Rd.
Baton Rouge, La. 70809
(800) 873-4384; (504) 291-7221

Intel Corp.
Network Management Business Unit
PC Enhancements Division
3549 N. University Ave.
Suite 150
Provo, Utah 84604
(801) 379-2200

McAfee Associates
3350 Scott Blvd.
Building 14
Santa Clara, Calif. 95054
(408) 988-3832

Command Software Systems, Inc.'s Net-Prot Professional and McAfee Associates' NetShield are much less developed than the other packages. Surprisingly, their lack of sophistication and features is not reflected in their pricing. NetShield, in particular, seems to be a poor buy, which is somewhat ironic, considering that McAfee Associates is one of the oldest antivirus vendors in business.

All six products were assessed from a network management viewpoint. For the evaluation, the NCSA keyed in on each product's integration with NetWare, enterprise network suitability, virus detection and handling capabilities, and virus reporting techniques. The review also focused on such issues as documentation, licensing and certification.

The NetWare Loadable Module (NLM) environment differs sharply from the workstation operating system environment. For an antivirus product to be server-resident in the NetWare environment, it needs to be implemented as an NLM, which is a C language program compiled for the NetWare environment. When this program is loaded, it effectively becomes part of the operating system.

In order to integrate well with the NetWare system, NLMs must meet some fairly strict performance standards. These standards concern how much processor time the product uses (to ensure that NLMs don't hog the system and compromise performance) and how they use system resources, such as memory.

Most of the products are fairly reasonable with their random-access memory requirements — the average is about 600K bytes. With its minimal 62K-byte requirement, Net-Prot Professional takes the prize.

Disk space use for all but one of the products is also minimal — between 250K and 1M byte. Untouchable Network proved to be the exception to this rule, tipping the scales at about 5M bytes.

ENTERPRISE NETWORKING

A critical issue is the ability to administer the antivirus product from a workstation rather than solely at the server console. NetShield was the only product that didn't offer this feature. Anti-Virus for NetWare and Net-Prot Professional support remote administration under both DOS and Windows.

All 7 vendors support DOS and Windows environments, but only Intel Corp.'s LANDesk Virus Protect and Central Point Software, Inc.'s Anti-Virus for NetWare support Macintoshes. McAfee Associates' NetShield has the sole distinction of providing native OS/2 support.

Two other critical enterprise networking features — the ability to pass updated virus detection information to other servers in the net and the ability to group servers into domains. All the products, with the sole exception of Net-Prot Professional, offer the capability to propagate changes to virus detection information.

Support for domains, however, is not as common. Domains let servers running antivirus packages monitor and communicate with one another. Only three of the packages — Untouchable Network, LANDesk Virus Protect and Anti-Virus for NetWare — feature the capability to group servers into domains.

Transfer status and update information is passed between the domain members. This feature prevents alerts — generated when viruses are detected or a related problem occurs — from being sent to servers outside the domain and potentially across wide-area networks, generating unnecessary network traffic. It is, after all, unlikely that a network administrator in New York would be interested in an alert generated in Singapore.

Domains are a good idea for NetWare 3.X systems because they provide a better management model than not having any domains. However, all of the products will need to integrate with the NetWare 4.0 NetWare Directory Services (NDS) to really work in an enterprise networking context, something that has not yet happened. Cheyenne and Command Software have scheduled domain support for future releases of their products, while McAfee Associates hasn't announced any plans.

Without a doubt, for extremely active net environments, two other features are required. The first, more crucial, feature is integration of the server-based virus detection services with the workstation antivirus systems. Anti-Virus for NetWare, InocuLAN and LANDesk Virus Protect offer this level of integration.

The ability to detect a virus event on a workstation as soon as it appears and have the server-based system log and raise the alert gives assurance that the event is recorded. Early warning also gives the net manager a time advantage in addressing the problem.

Some of the packages — LANDesk Virus Protect and Anti-Virus for NetWare, for example — use programs loaded from batch files and the system logon scripts to load the antivirus software. This method doesn't guarantee that the antivirus software will be loaded and continue to run. For instance, a software error, an interfering user or a virus could interfere with the loading of the antivirus software or short-circuit it at a later time. If any of these events occurs and the file server software isn't monitoring the workstation system, a virus could become established.

The second feature, which is offered by all of the products, is support for real-time scanning of files as they are read from or written to the server. Real-time scanning provides the greatest chance of detecting virus activity before it can spread far.

All of the vendors bundle a workstation product, but only the Cheyenne NLM has the ability to terminate a server connection if the workstation isn't running the antivirus product. This is a facility that all of the vendors should offer. This ensures that if a user or a

Continued on page 63

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Circle Reader Service #3

Continued from page 59

virus intentionally or accidentally disengages or removes the workstation protection, the server NLM can detect and report it.

VIRUS DETECTION

All seven products offer a scan mode that searches files for viruses and, where supported, verifies checksums. All of these products allow users to schedule the scans. In tests conducted by various researchers (including, for example, the VSUM certifications run by Patricia Hoffman, author of the *VSUM Database*), all of these products have proven their ability to detect more than 1,000 viruses.

However, the reality is that of the more than 2,000 known viruses, only about 250 have ever been seen outside of a laboratory. In fact, only 40 are classified as common, and 95% of all cases involve roughly a dozen strains. All of the products successfully detect the common viruses using virus signatures. That is, they look for sequences of data that are characteristic of each virus in the infected program's code. Only InocuLAN and Net-Prot Professional restrict their checking to simple signatures.

Given the low probability of encountering a rare, known virus, it's more important that the product attempt to detect unknown viruses. There are two strategies for this. One is to checksum all of the files that could be infected and then monitor them for changes. Untouchable Network and NetShield use this technique, but Untouchable Network goes one step further and stores the checksum database on the server's DOS partition for added security.

The other method for detecting unknown viruses is called heuristic detection. This technique, which relies on real-time monitoring of file usage, involves watching for activities that are indicative of virus infections. For example, if the file type is executable and a workstation attempts to update the file contents by modifying it and extending the file, there's a good chance that a virus is at work.

Antivirus software features

Vendor	Central Point Software, Inc.	Cheyenne Software, Inc.	Command Software Systems, Inc.	Fifth Generation Systems	Intel Corp.	McAfee Associates
Product	Anti-Virus for NetWare	InocuLAN	NetPROT Professional	Untouchable Network	LANDesk Virus Protect	NetShield
Version	1.10	2.01	1.10	2.00	2.00	1.52
Base price	$1,199	$495	$995	$1,295	$995	$495
Servers licensed	1	1	Unlimited	1	1	1
Nodes licensed	Unlimited	20	25	10	Unlimited	Not applicable
NetWare Loadable Module features						
Memory required (K bytes)	694	927	62	967	287	718
Remote administration	Yes	Yes	Yes	Yes	Yes	No
Copy configuration between servers	Yes	Future	Yes	Yes	Yes	No
Console lock	Yes	Yes	Yes	Yes	Yes	No
Password-protected unload	Yes	Yes	Yes	Yes	Yes	Yes
Centralized server updating	Yes	Yes	Future	Yes	Yes	Yes
Domain support	Yes	Future	Future	Yes	Yes	No
NetWare 3.11-certified	Yes	Yes	Future	Future	Yes	In progress
NetWare 3.12-compatible	Yes	Yes	Yes	Unknown	Yes	Unknown
Operation						
On-demand or scheduled pass	Yes	Yes	Yes	Yes	Yes	Yes
Scans DOS files	Yes	Yes	Yes	Yes	Yes	Yes
Scans Macintosh files	Yes	Yes	No	Yes	Yes	No
Exception files can be specified	Yes	No	Yes	Yes	Yes	Yes
Scans server DOS memory	Yes	No	No	No	Yes	No
Detection methods						
Signature	Yes	Yes	Yes	Yes	Yes	Yes
File checksum	No	No	No	Yes	No	Yes
Heuristics	Yes	No	Future	No	Yes	Yes
File-type selection	Yes	Yes	Yes	Yes	Yes	Yes
Real-time incoming	Yes	Yes	Yes	Yes	Yes	Yes
Real-time outgoing	Yes	Yes	Yes	No	Yes	Yes
Alerts and reporting						
NetWare Message Handling Service (MHS)	Yes	Yes	Future	Yes	Yes	No
Pager	Yes	Yes	Future	Future	Future	No
NetWare Management Services support	Future	No	Future	Future	No	No
SNMP support	Future	No	Future	Future	Future	No
Enterprise alert logging	Yes	No	Future	No	Yes	No
Export log	Future	No	Future	Yes	Yes	No
Log printing	Yes	Yes	No	Yes	Yes	Yes
Infected file handling						
Repair	No	Yes	No	Yes	No	No
Delete	No	Yes	Yes	Yes	No	Yes
Secure delete	Yes	No	Future	Yes	Yes	Yes
Quarantine	Yes	Yes	Yes	Yes	Yes	Yes
Rename	Yes	Yes	Yes	Yes	Yes	No
Report only	Yes	Yes	No	Yes	Yes	Yes
Workstation Access Value Plan						
Workstation AVP bundled	Yes	Yes	Yes	Yes	Yes	No
Integrates with workstation AVP	Yes	Yes	Future	No	Yes	No
Enforce workstation AVP use	No	Yes	Future	No	Future	No
Operating System support						
DOS	Yes	Yes	Yes	Yes	Yes	Yes
Windows	Yes	Yes	Yes	Yes	Yes	Yes
Macintosh	Yes	Future	No	Future	Yes	No
OS/2	Future	No	No	Future	Future	Yes

SOURCE: GIBBS & CO., VENTURA, CALIF.

LANDesk Virus Protect, NetShield and Anti-Virus for NetWare claim to use this kind of detection but are understandably reticent about providing too much detail.

Once a file is suspected of being infected by a virus, action is warranted. All of the packages, except for Net-Prot Professional, offer the option of generating a report without taking any action. Why anyone would just want a product to produce a report, not generate an alert, is hard to fathom.

There are five other actions that can be taken. First, the antivirus software can try to repair the file, but this is not always successful, particularly when a file has multiple infections. InocuLAN, LANDesk Virus Protect and Untouchable Network offer this repair capability. All of the packages can move infected files to secure directories for analysis — a process called quarantining. All of these packages also provide file deletion capability. InocuLAN and Net-Prot Professional can delete infected files. All of the other products offer a secure delete feature, which erases the file and then overwrites the disk to ensure that the file is not salvaged later. Untouchable Network and NetShield offer both types of deletion.

The final choice is to rename the file, which is offered by all vendors except NetShield. Of course, renaming the file without moving it to a more secure area can lead to problems. If users have read access to the file, they can make copies and spread the virus further.

EVENT REPORTING

All products except NetShield print event logs. Only Intel and Fifth Generation products can export the log to an ASCII file that can be imported into word processors and databases.

Only LANDesk Virus Protect and Anti-Virus for NetWare support enterprise alert logging — the collection of events by one server from a number of other servers. Some of the other vendors support this facility at the workstation management console, but this is a less powerful strategy.

All of the products can be configured to broadcast a message to selected NetWare users when an event occurs, but NetShield and Net-Prot Professional are unable to send event reports via Novell's NetWare Message Handling Service (MHS).

InocuLAN and Anti-Virus for NetWare directly support alert forwarding via pagers. For many network managers, being able to receive alerts through a pager is a very effective tool. Since NetWare MHS can be enhanced to transmit messages to pagers, this feature can be extended to the other products.

Currently, none of the vendors support Novell's NetWare Management System (NMS), although three indicated that they are considering it for a future release. More importantly, none yet offer Simple Network Management Protocol support. Support for SNMP alerts is critical to enterprise networking function. Four of the vendors say they will support SNMP in a future release.

InocuLAN, LANDesk Virus Protect and NetShield allow users to include support for running their product at various performance levels so that the load on the server is minimized. In some environments, this might prove useful. However, since scans are usually scheduled for off-peak times, it's not a critical decision feature.

Documentation varies widely among the products, ranging from very good (InocuLAN, LANDesk Virus Protect and Anti-Virus for NetWare), through adequate (Net-Prot Professional) to very poor and on-disk only (NetShield). Similarly, the on-line help in the products was generally found to be at the same level as the documentation.

The notable exception was NetShield, which always produces the same message, "No help is available at this point in the program. Consult your documentation for assistance." Because the documentation is on disk, this is not really helpful.

There are some bloopers in documentation. For example, in the InocuLAN Supervisor's Guide, page 5-32, "...more viruses infect executable files than any other type..." Because viruses only affect executable files, this statement is misleading.

All of the products except for Net-Prot Professional are licensed by the file server, and only NetShield isn't bundled with a workstation-based antivirus product. Anti-Virus for NetWare and LANDesk Virus Protect allow unlimited users per server.

The oddest method of licensing belongs to Net-Prot Professional, which is bundled with F-Prot Professional — a workstation antivirus product — and is licensed by workstations. Thus, the smallest version of F-Prot Professional is licensed for 25 workstations and includes a license for as many servers as those 25 users access.

Because of the relationship between NLMs and NetWare, Novell has a certification scheme to examine and test NLM products.

See NetWare, page 66

Spreading infection

Computer viruses are nothing more than programs that can attach a copy of themselves to another program. In a net with weak security, a virus can spread swiftly. With large amounts of storage on workstations, infections that have reached plague proportions can be difficult to cure.

When a computer virus enters a net, it will usually do so through a workstation. It may be introduced by floppy disk, a program downloaded from a bulletin board or (rarely) from a program attached to an electronic mail message.

With floppy disks, the disk could be brought from a net user's home, purchased from a retail shop or even be a disk used by a service engineer. The other route by which a virus can enter and damage a net is through the server. In the case of a NetWare server, this can only occur through the DOS disk partition used to start the server.

Infection of programs on the server's DOS partition can occur at two times: when the system or supporting software is installed, or when engineering work is carried out. The danger posed by a virus infecting files on the DOS partition is that it may cause a disk reformat or perform random writes to the hard disk before or after the server software runs. This could destroy the partition table or damage the NetWare file system.

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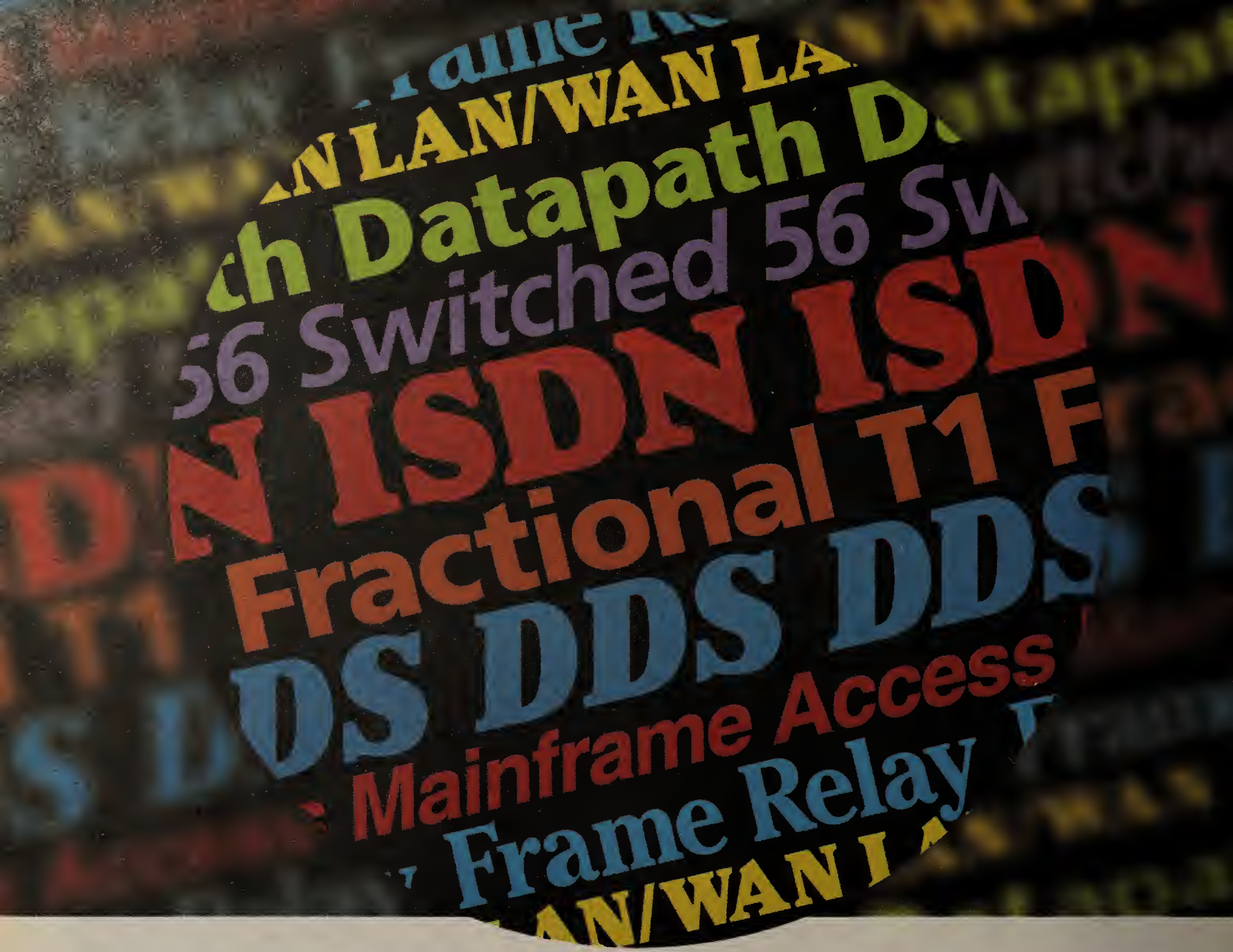

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NetWare

Continued from page 63

Unfortunately, Novell's certification program is somewhat backlogged, preventing some products from getting immediate attention.

Both Net-Prot Professional and Untouchable Network are not certified, although both companies that make those products indicated that they plan to start the certification process shortly. NetShield is going through the certification process now. The remaining three products — Anti-Virus for NetWare, InocuLAN and LANDesk Virus Protect — have been certified for NetWare 3.11. Novell has not yet instituted a certification program for NetWare 4.0.

Certification by Novell is important for quality assurance. It is also important for any vendor of an NLM product to at least begin the certification process. Although it would be nice to recommend only NLM-certified products, it is impractical due to Novell's delays in issuing these certifications. An issue that has stirred some controversy is the use of undocumented features. LANDesk Virus Protect and Anti-Virus for NetWare, for example, use undocumented features to implement real-time scanning of file reads and writes.

Although modifications to the core of NetWare are undesirable — modifying an operating system's code can make the system unstable and, in worst cases, lead to system crashes — it is the only way that real-time monitoring can be implemented under NetWare 3.11.

Novell has approved this technique in principle and now evaluates products that use it on a case-by-case basis. It has also committed to recertifying approved products for each NetWare release to ensure compatibility. This is required because the code that the NLMs modify may change between releases in a way that makes the system unstable. Under NetWare 4.0, no such kludge is required since there is specific system support for the technique.

NetWare 4.0 demands that these antivirus products undergo some major modifications in order for them to operate optimally and function as part of an enterprise networking environment. Claiming that a product is NetWare 4.0-compatible without specific support for NetWare 4.0 features is missing the point.

True NetWare 4.0 support — integration with NDS and the ability to work with all of NetWare 4.0's security features — is not available yet. When the vendors do finally implement support specifically for NetWare 4.0, the products should be easier to configure and manage in large, complex internetworks.

Meanwhile, users need to weigh the importance of implementing server-based antivirus NLMs. For some, the issue may come down to questioning whether such products are worth the investment. NetWare sites that ignore the need for virus protection are taking unnecessary financial risks. At least with the products in this piece guarding the servers, sites stand a chance of detecting an infected file instantly.

➾ Gibbs is a writer, analyst and consultant based in Ventura, Calif. He also holds a position as technology analyst to the National Computer Security Association. He can be contacted at (805) 647-2307, through CompuServe (75600,1002) or on the Internet (mgibbs@rain.org). He is the author of several books, including *The Absolute Beginner's Guide to Networking* and *Navigating the Internet* (both from Sams Publishing).

Big picture

Continued from page 56

Lee Corp. "They both have portability across platforms, a modular architecture, reusability of modules and integration with relational database services, security services and various other services."

However, there are drawbacks to the portable languages. "When you look at cross-platform compatibility, SmallTalk is slower than AppWare. The other problem is it's licensed on a per-user basis — which can make the product more expensive. And the third issue is that they use more resources. Under ParcPlace, you need 32M bytes of memory just to run the application," Bandrowski says. "AppWare doesn't add that overhead."

ON THE BANDWAGON

While some pundits have claimed growth in the NOS market is slowing, others say there is a dearth of applications driving the market expansion. Novell's AppWare strategy is ambitious, but if it works, it could break the network application logjam that's holding the industry back.

"The real question is whether AppWare will have the ALMs and whether third-party development tools are going to support them," Bandrowski says. "For the most part, I have a wait-and-see attitude toward it until those things happen."

➾ Mardesich is a San Francisco-based analyst with The Burton Group, the publisher of an information service about network computing strategies. She may be reached via MCI Mail at 597-7798.

Users

Continued from page 52

NSM application — currently based on MSAPI — will be required, as well.

FUTURE DIRECTIONS

As Novell expands NMS' capabilities in such key areas as remote monitoring, router management and — someday soon — SNMP-based management, some users wonder when other outstanding gaps in NMS will be filled.

For instance, while such facilities as monitoring CPU and disk utilization rates are currently supported as freestanding NetWare utilities, many believe that integrating them into NMS would make sense.

Novell has also indicated it will support such functions as electronic software distribution and application license management. But Novell has not yet announced commitments to integrate these functions in NMS.

Meanwhile, company officials are more willing to talk about their efforts to ramp up NMS to enterprise management functionality. By moving more processing to the departmental servers, Novell's Dauber says that "eventually, the consoles will just be displays for viewing the enterprise." One domain, or group of LANs, would have one or more consoles, and a console would be able to view one or more domains, providing the many-to-many relationship needed in complex internetworks.

➾ Rhodes is a lead consultant in the Houston office of Business System Group, Inc., a national client/server systems integration firm, and can be reached at (713) 965-9000 or via CompuServe at 70523,470.

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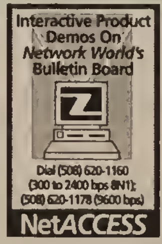
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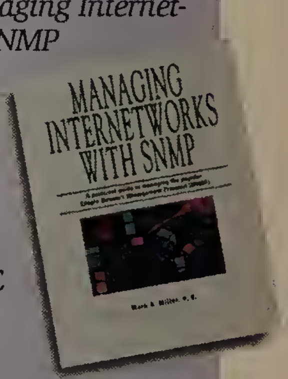

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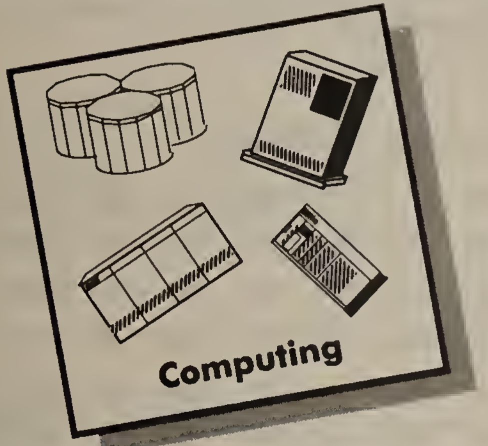

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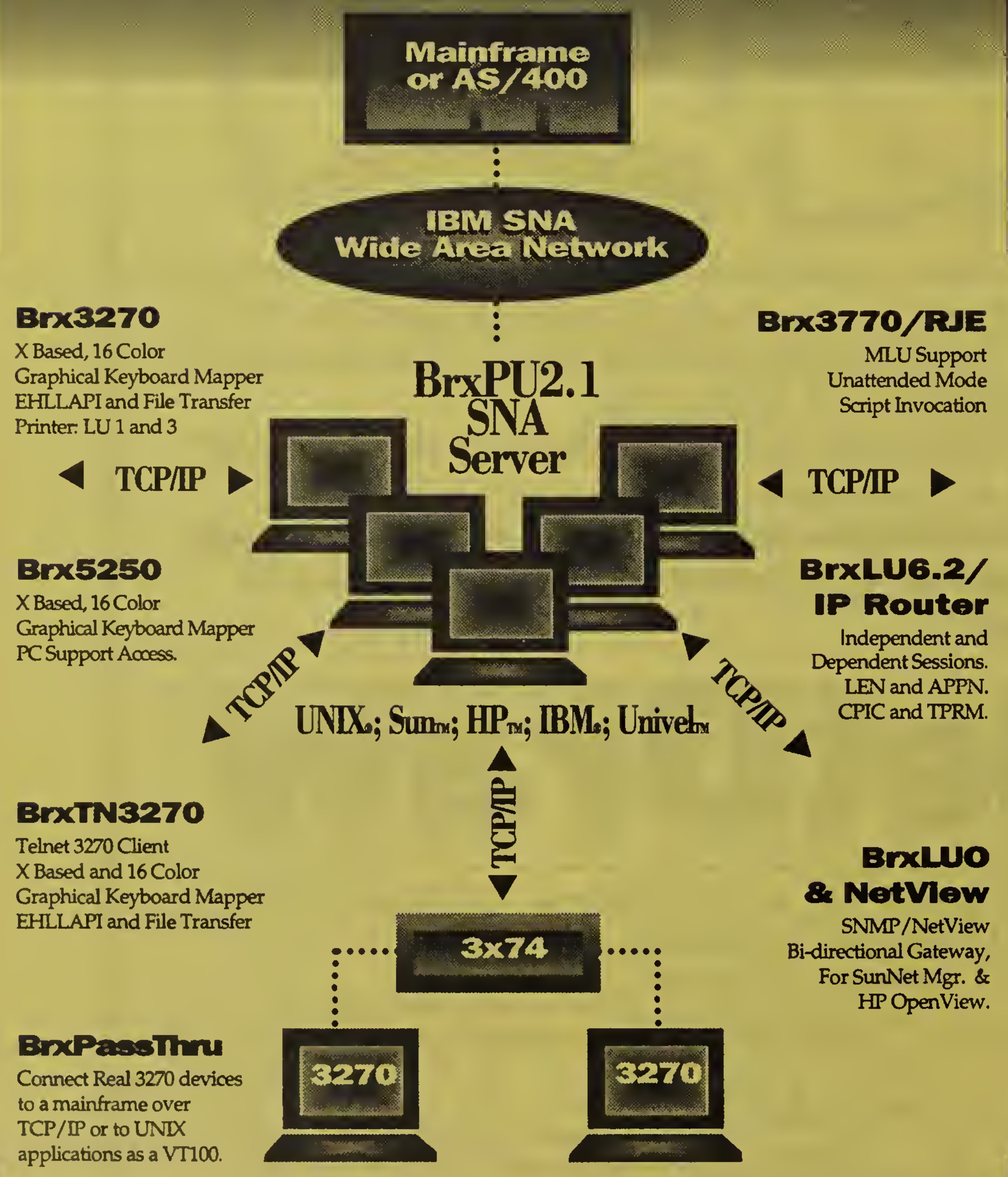

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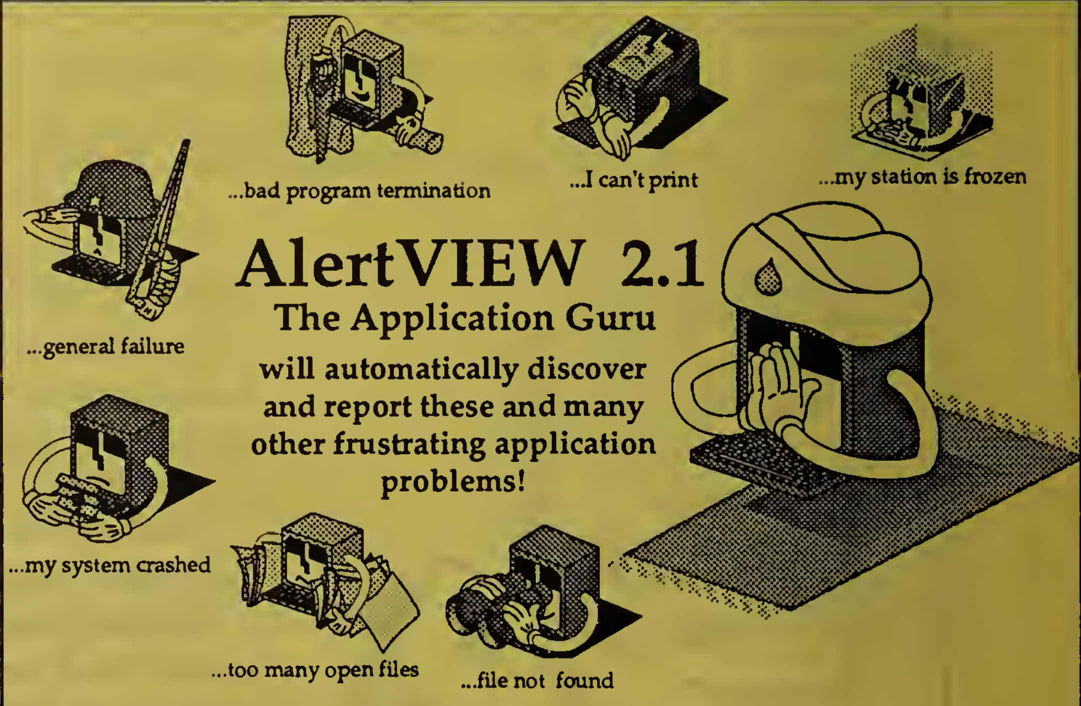

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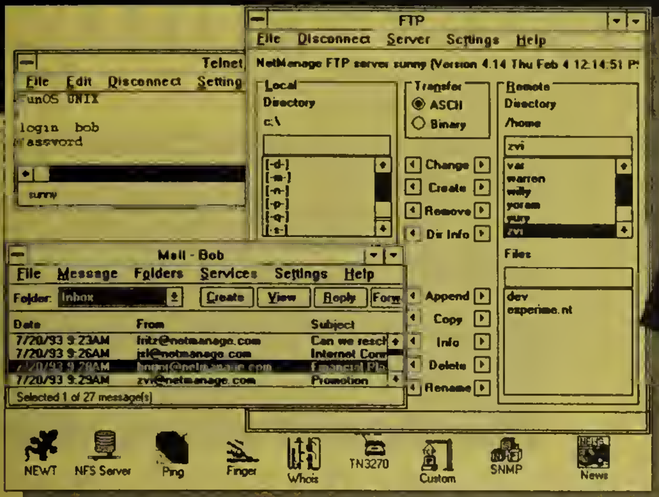

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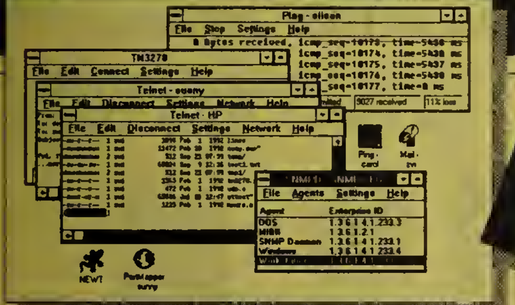

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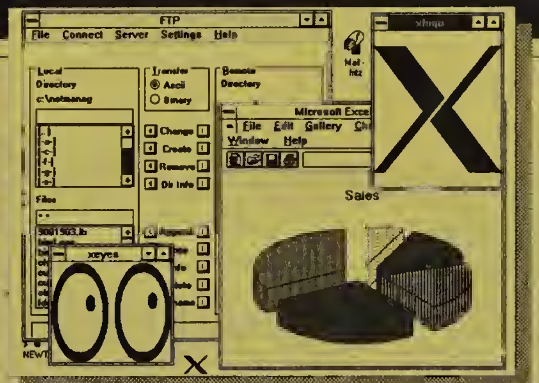

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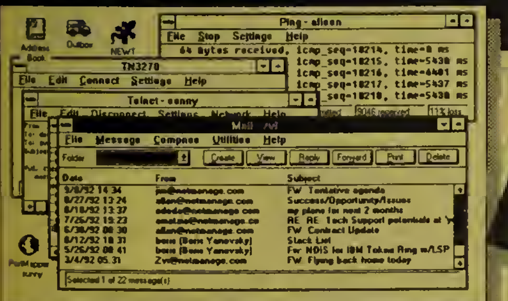

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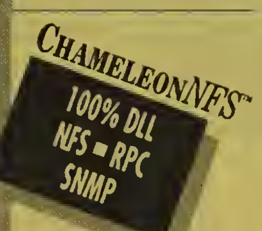

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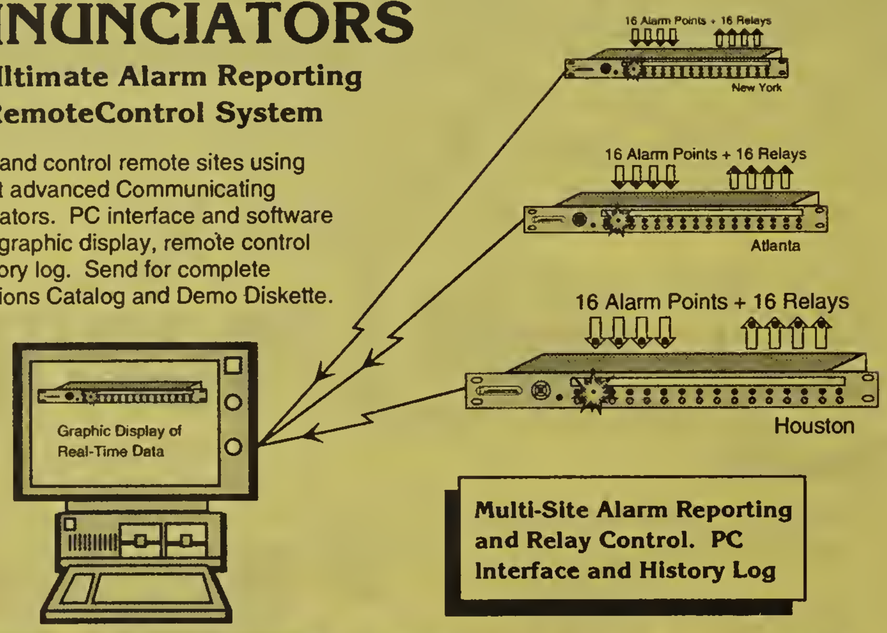
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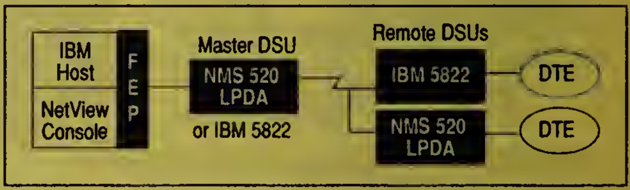

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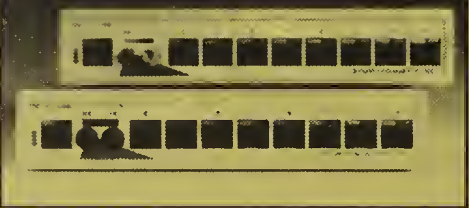

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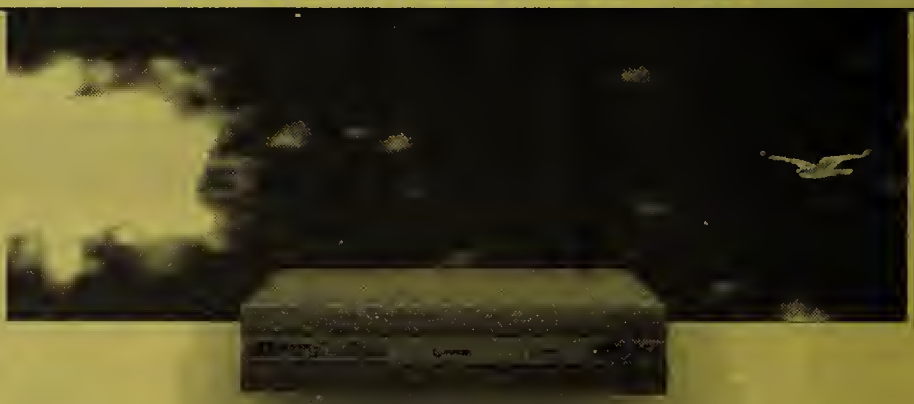

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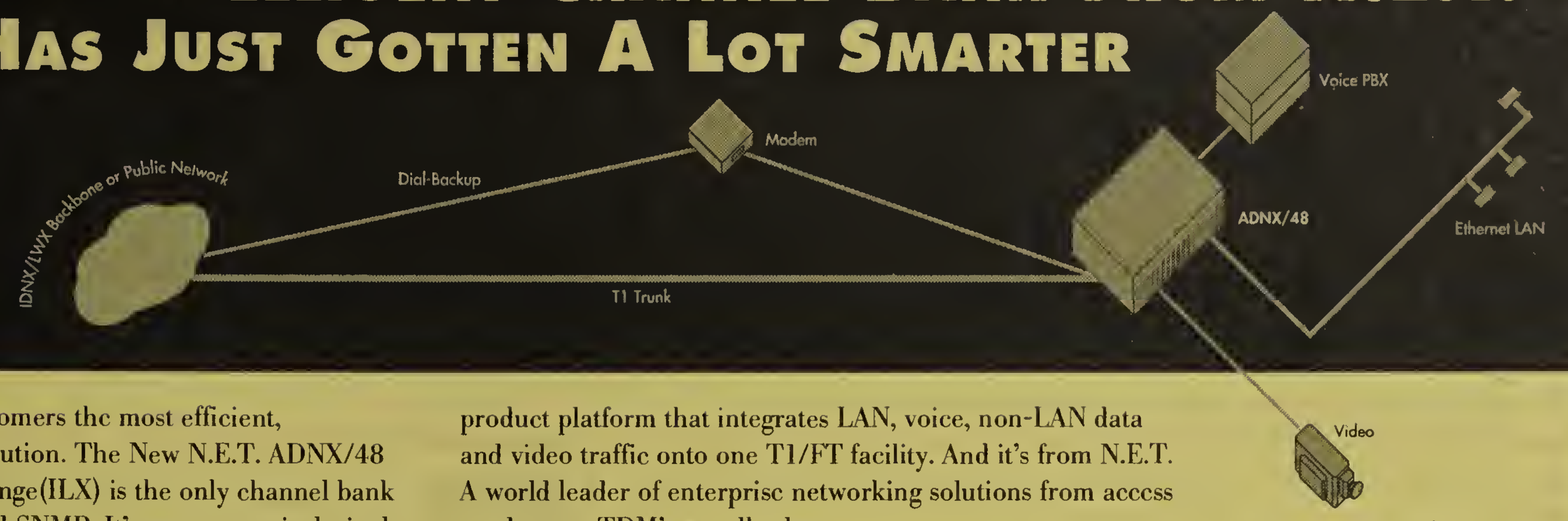

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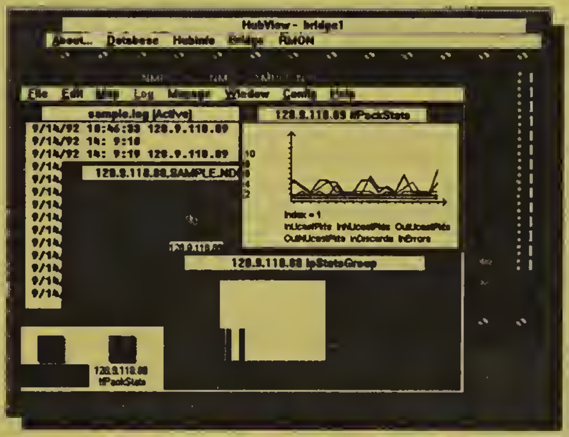

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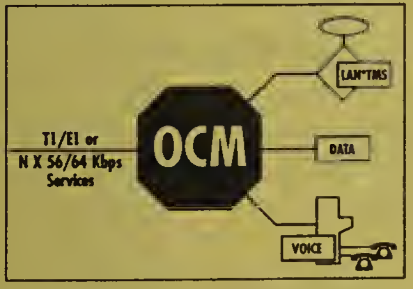

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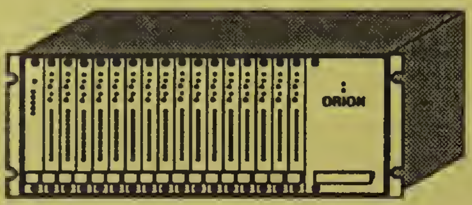

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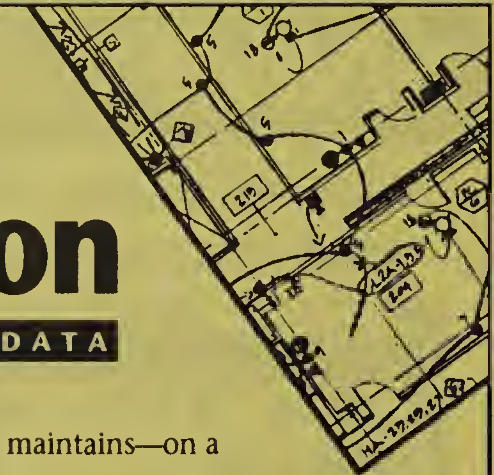

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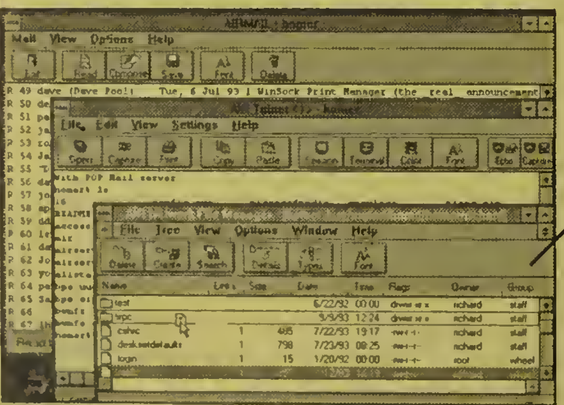
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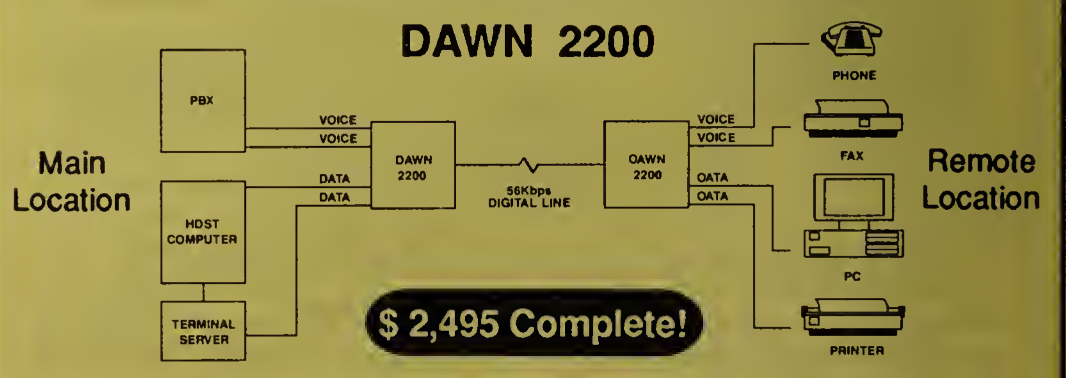

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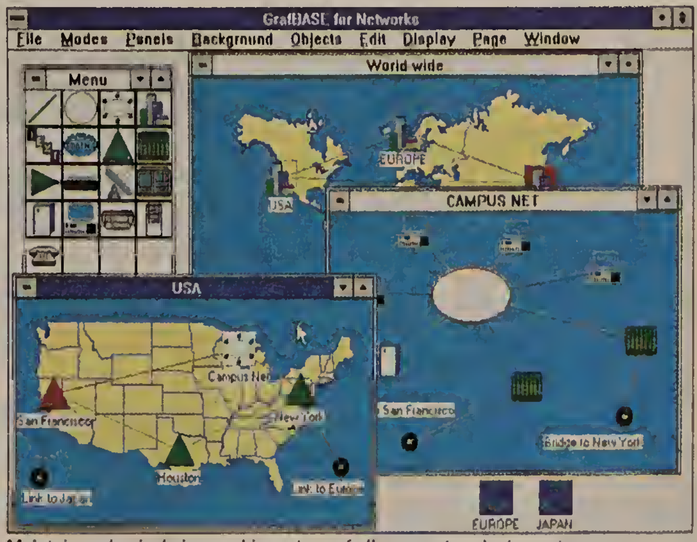

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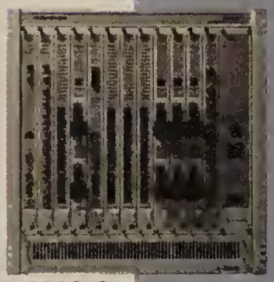
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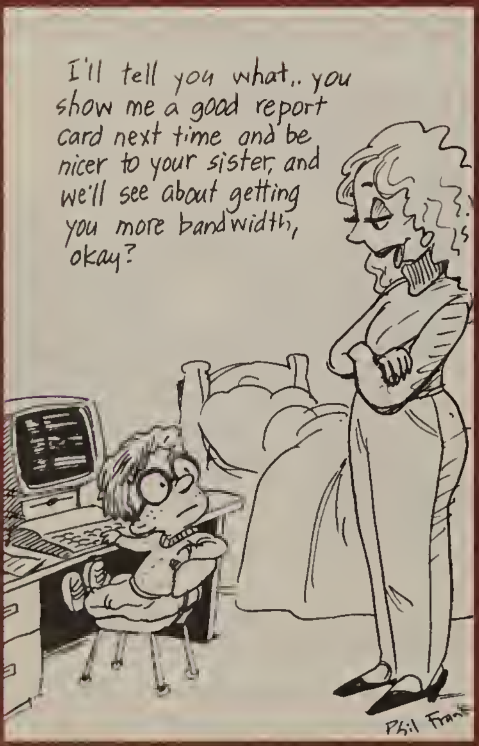
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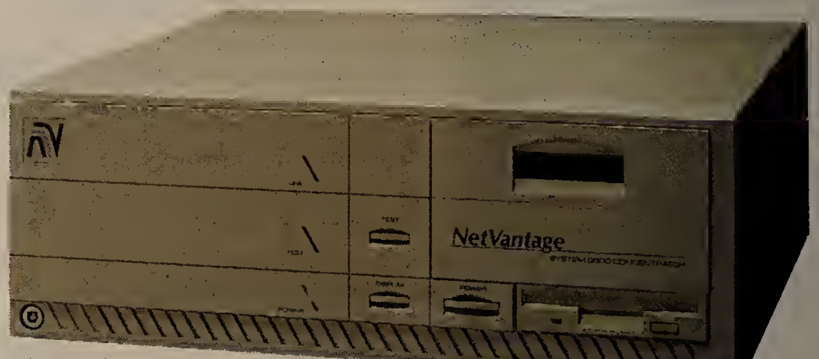

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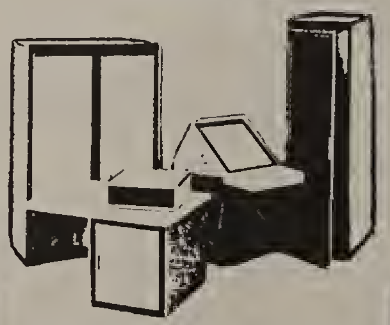

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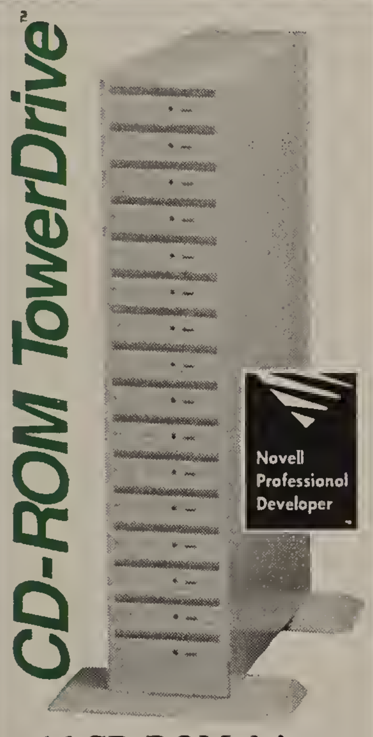

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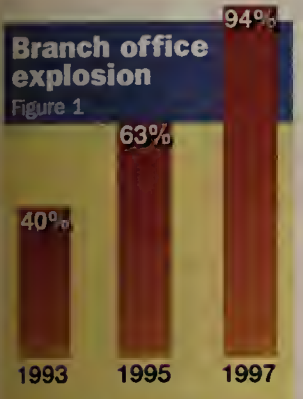
Head-to-head

Continued from page 1

Michael Howard, president of Infonetics Research, Inc., which recently completed a study of that market.

"Not only are the number of remote sites and branch offices growing, but the need to connect them to the enterprise net has become a top priority for many companies," he said (see Figure 1, this page).

Branch office explosion
Figure 1



The percentage of remote LANs that are connected to corporate headquarters will more than double by 1997.

SOURCE: INFONETICS RESEARCH, INC., SAN JOSE, CALIF.

HUB MANIA

The integrated solutions being developed today run the gamut from routing modules for hubs to hub-based personal computer and server modules that support a variety of network functions and minimize the number of boxes needed at a remote site.

SynOptics Communications, Inc. and Cabletron Systems, Inc., for example, recently announced 486-based PC modules for their hubs that will run software-based routers and network operating systems — creating, in effect, a branch office in a box. The module can be preconfigured by the net administrator and shipped to the remote site, where it is simply plugged into the hub.

"It's more than just a router. It's really a branch in a box," said Asher Waldfogel, group manager of product management at SynOptics.

In some cases, such as SynOptics' acquisition of router maker Coral Networks Corp. last week (see story, page 1), hub makers are purchasing the needed routing technology outright, meaning all proceeds from router/hub integration will go directly into their own pockets.

The hub vendors are not alone in offering simpler routing alternatives. Case in point: Novell, Inc., which offers its Multiprotocol Router software for server platforms.

For their part, router vendors are developing products that meet the needs of remote office users, including low cost, as well as ease of use and installation.

3Com Corp. led the charge in this area with its Boundary Router devices. The Boundary Routers support a single wide-area network link to corporate headquarters and off-load most of the complex routing decisions to a central backbone router maintaining all routing tables. Cisco Systems, Inc. has countered with its 2000 Access Router, and most other router companies have low-end devices under development.

Routing alternatives for remote offices
Figure 2

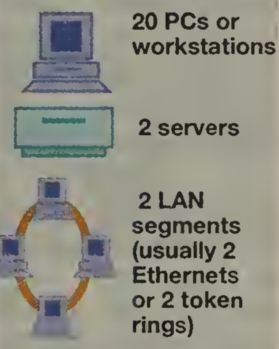
- A stand-alone router
- Hub-based router modules
- Router software on hub-based PC module
- Router software on stand-alone PC server
- A dial-up router
- A stand-alone router with integrated hub features
- Fixed-port work group hubs with embedded routing
- Remote office bridges feeding regional, stand-alone routers

SOURCE: INFONETICS RESEARCH, INC., SAN JOSE, CALIF.

The remote office opportunity has given rise to another group of vendors supplying dial-up routers. Products from such suppliers as Telebit Corp. and Centrum Communications, Inc. are designed as low-cost alternatives for the smallest remote sites.

Like the hub vendors, the router makers are also buying up the technology they need for an integrated router/hub solution, made evident by the acquisitions scored by Cisco (Crescendo Communications, Inc.) and Network Systems Corp. (Bytex Corp.)

Figure 3
A typical branch office includes:


20 PCs or workstations
2 servers
2 LAN segments (usually 2 Ethernets or 2 token rings)

SOURCE: INFONETICS RESEARCH, INC., SAN JOSE, CALIF.

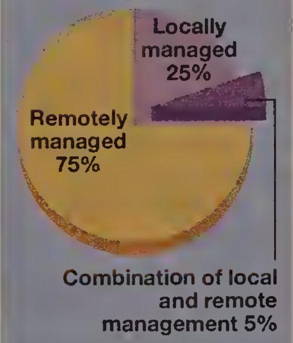
AND THE WINNER IS...

Whether users choose an integrated hub/router solution or stand-alone devices, routing in remote sites will largely be based on the size of the office and the complexity of the network environment.

"If it's a small location, we'd rather put the routing internal to the hub because we're not looking for really high performance and we can take advantage of redundant power supplies in a hub," said Darwin Gensel, communications engineer and token-ring net manager at Niagara Mohawk Power Corp. in Syracuse, N.Y.

That view is not shared by Tom Kadlec, vice president of local-area network design and engineering at Citicorp. "If you're running mission-critical applications, a stand-alone approach is safer because you're not putting all your eggs in one basket," he said. "You don't have a single point of failure."

Locally managing remotes
Figure 4



SOURCE: INFONETICS RESEARCH, INC., SAN JOSE, CALIF.

Some users also see differences in performance between the two methods. "I'm leaning toward stand-alone Cisco routers because the SynOptics version of that router has a slower processor, meaning we take some performance hit," said Tom Speer, lead engineer and Gensel's Ethernet counterpart at Niagara Mohawk.

Management concerns also play a key role in the decision. "If there isn't any management advantage [from having the routers in the hub chassis], I'm not saving an awful lot by using the router in the hub," Speer said.

COST CONCERNS

Mike Skubisz, director of product management at Cabletron, added, "Administration costs are higher on a distributed system because you have to buy net management applications from all the vendors involved," he said. "There is also the training and support costs of supporting five boxes."

And, not surprisingly, budgets are a big factor. "Routers integrated in hubs make a lot of sense economically, but we have a base of stand-alone routing hardware we can't afford to scrap," said Glen Dailey, telecommunications analyst at Union Carbide Corp. "As next-generation technology is needed, we may look to an integrated solution."

Kadlec concurred. "Our stand-alone approach works well, it's just expensive," he said. "It's possible we'll get into a site where [performance is] not critical, and we might want to bundle the hub and router up and ship them out in one piece."

Robert Goldberg, principal network technologist at Northrop Corp. in Century City, Calif., summed it up best. "The bottom line is that both routers and hubs have their place in the network, and it's a matter of a technical and economic decision of what makes sense for a particular company." ☐

Buyout

Continued from page 1

Analysts said the merger activity is due to a growing convergence of high-speed LAN switching and routing functions at the departmental level. All of the deals were driven by time-to-market concerns as vendors scramble to ensure they have what it takes to satisfy the needs of this fast-growing and lucrative network segment.

"Users are starting to look at switched Ethernet to the desktop as the solution for high-end workgroups, and this is where the hub and router vendors will truly become competitors," said Val Shribar, senior research analyst at META Group in Reston, Va.

Although the hub vendors are best positioned to offer switched LAN solutions in collapsed backbone architectures — where departmental devices feed a master router or hub — they still need routing technology at the departmental level to act as fire walls to prevent things such as packet broadcast storms.

Routers can be used to tie LANs back to a central router, but they lack the wiring simplification, LAN integration and management benefits hubs provide.

And while routers are extensively used to anchor these collapsed backbones, router vendors also want a piece of the departmental sale. Routers can be used to tie LANs back to a central router, but they lack the wiring simplification, LAN integration and management benefits hubs provide.

SynOptics' acquisition of Coral differs in scale and purpose from an earlier and ill-fated strategic partnership between Cisco and SynOptics to meld hub and routing into a single device. The so-called Cisco-Synoptics RubSystem effort was an attempt to merge two full-scale systems, which would have made it difficult to bring the product to market on time.

BUYING CORAL

The buyout of Coral, on the other hand, will provide SynOptics with the basis to complement its departmental switching hubs with routing technology. Although SynOptics was mum on how it will use the Coral technology, analysts said it will design a customized routing engine for use in the 5000 series hub (see story, page 3).

The two latest acquistions also illustrate how the two technologies will still maintain separate roles in other parts of the enterprise net.

NSC will merge the routing and hubbing technology not only to form a switching hub, but also to sell the hub and router gear stand-alone. The router, for instance, will provide security and filtering capabilities between broadcast domains and will also be necessary to link LANs across the wide-area net.

"We see a number of areas in the building environment where switching can do some of the things routing is doing today, but routing still has a critical role in other parts of the network," said Bill Lanfri, SynOptics' vice president of marketing.

Routing kingpins Cisco and Wellfleet Communications, Inc. concurred. Both said that, despite the growing popularity of integrated router/switching hubs at the departmental level, the role of the stand-alone high-end router to anchor a collapsed backbone net — and link those to other campus nets across a WAN — will remain secure.

"Strategically, we believe integrated routing/hubbing/switching makes sense at the access points of the network, but at the concentration points, users are still going to migrate to best-in-class products — be it a router, hub or ATM switch," said Gary Bowen, Wellfleet's vice president of marketing.

Bowen declined to say whether Wellfleet will be teaming with a switching hub vendor. The lack of such a pairing, however, will make it difficult — if not virtually impossible — for Wellfleet to compete effectively at the work group level, Shribar said.

Pairing up

Single	Possible paramours
Cabletron Systems, Inc.	Alantec Corp.
Chipcom Corp.	Artel Communications Corp.
*Proteon, Inc.	Kalpana, Inc.
*3Com Corp.	Synernetics, Inc.
Wellfleet Communications, Inc.	

Married
Cisco Systems, Inc./Crescendo Communications, Inc.
Network Systems Corp./Bytex Corp.
SynOptics Communications, Inc./Coral Network Corp.

Engaged
Ungermann-Bass, Inc./ACC

* Manufacture both hubs and routers

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: *NETWORK WORLD*

"Wellfleet is behind the curve on this one. If they want to continue doing volume sales, they've got to get up the building riser to those floors."

At the other end of the spectrum, at least one leading hub vendor views its role as providing all users' enterprise-wide routing and hub needs. Cabletron Systems, Inc. is currently developing its own routing technology and will deploy it down to the port level on its line of intelligent hubs.

➾Skip MacAskill contributed to this story.

Codex DSU cuts costs

Motorola Codex last week unveiled a data service unit (DSU) targeted at remote sites looking for fractional T-1 performance at 56K bit/sec leased-line prices.

At the same time, the company unwrapped software that allows users to manage any Motorola Codex modem or DSU from any Novell, Inc. NetWare local-area network client.

The new 3512 Synchronous Data Compression DSU uses data compression to provide 256K bit/sec throughput over 56K bit/sec lines, said Dave McNamara, director of marketing for Motorola Codex. It is intended to be a cost-effective means of shipping terminal-to-host traffic and LAN data over a 56K bit/sec circuit to the corporate backbone.

The 3512 supports three input channels and a single 56K bit/sec wide-area link. One of the input channels funnels data into an internal compression engine that provides about 4-to-1 compression for synchronous data, McNamara said. The other two channels feed into an internal time-division multiplexer, which can be used to mix in terminal traffic.

Compressed costs

Monthly costs of leased 56K, 192K and 256K bit/sec circuits

Miles	56K bit/sec	192K bit/sec fractional T-1	256K bit/sec fractional T-1	Annual savings with 56K bit/sec
50	$780	$1,935	$2,175	$13,860-$16,740
100	$800	$1,980	$2,230	$14,160-$17,160
250	$850	$2,100	$2,400	$15,000-$18,600
500	$930	$2,325	$2,680	$16,740-$21,000

- AT&T Tariffs as of August
- Includes average of 10-mile local access charges

GRAPHIC BY ANNE GIANCOLA SOURCE: MOTOROLA CODEX, MANSFIELD, MASS.

The DSU supports RS-232/V.35 interfaces on the lower speed channels, which support synchronous data rates from 1.2K to 56K bit/sec, and asynchronous rates of 2.4K to 19.2K bit/sec. The compressed channel supports only a V.35 interface, with synchronous data rates of 1.2K to 256K bit/sec and asynchronous speeds from 2.4K to 19.2K bit/sec.

Compression cannot be used for asynchronous transmission or for synchronous speeds below 9.6K bit/sec.

Joe Noel, an analyst at Dataquest, Inc., said the 3512 will allow users to put off ugrading their 56K circuits. "Among the user community, it isn't just simply a decision of 'Hey, this 56 is maxed out, let's just swap it out for a fractional T-1,' " Noel said. "It's usually living with the pain of a 56 pipe that's just too slow."

The 3512 costs $2,395 and will be available Oct. 15.

Motorola Codex also announced WANVisible, a NetWare Loadable Module for Novell NetWare 3.11 and 4.0 servers that allows users to manage Motorola Codex transmission devices, including the 3512 SDC DSU, from a NetWare client.

Using WANVisible, NetWare administrators can monitor the status of a wide-area link configured with a Motorola Codex modem or DSU. When a link failure alarm is activated, the administrator can then initiate dial backup from a NetWare console.

A single WANVisible module can monitor as many as 50 Motorola Codex devices.

WANVisible is available now free of charge to NetWare 3.11 and 4.0 users.

©Motorola Codex: (508) 261-4000.

BY JIM DUFFY

Middleware

Continued from page 1

via Technologies, Inc., a subsidiary of Galileo International, which operates one of the largest worldwide computer reservation systems (CRS).

COMMUNICATIONS INTEGRATOR

The middleware, dubbed the Communications Integrator (CI), was developed in the 1980s to build United Air Lines, Inc.'s CRS, which is now part of the Galileo CRS. Covia was spun off in 1991 to market the product commercially.

Covia's CI is software that simplifies the process of building distributed applications. It presents developers with a four-verb application program interface (API) for linking applications in a peer-to-peer fashion using various network protocols across multiple operating platforms.

CI has made it easier for MCI to develop new applications, such as Friends and Family, because it frees up programmers from having to understand communications technology in order to build distributed applications, Holmes said.

This speeds up the application development process because it lets developers focus on building applications instead of worrying about navigating network protocols and services.

Middleware products like CI also separate applications from the network, allowing companies to swap out or consolidate underlying network protocols and change network addresses or pathways without having to rewrite application code.

MCI uses Covia's CI to connect CICS applications running on more than 40 IBM MVS mainframes in 10 data centers throughout the U.S.

The telecommunications giant will also soon begin porting Covia's CI to about 7,000 OS/2 workstations on 200 IBM Token-Ring Networks. This will enable MCI employees to use intelligent workstations to access and manipulate information kept on MVS host machines.

"Covia's CI will enable us to build a cooperative processing infrastructure that will give users access to information and applications anywhere on our network," Holmes said.

BATCHES OF ONE

Holmes is bullish on message-oriented middleware because he has seen firsthand how it can streamline communications between legacy-bound systems.

For example, MCI has used Covia's CI to cut the time it takes to sign up new residential customers from five days to just one day, Holmes said.

Adding a new subscriber is a multistep process that requires the interaction of several batch systems. Previously, these systems updated one another at night, which meant it took a day to complete each step in the process.

Covia's CI connected all the CICS batch processes in near real time using asynchronous messaging. Now when one system completes a transaction, CI automatically delivers it in the form of an interprocess message to the next CICS application across an LU 6.2 link.

By streamlining the batch cycle and cutting five days off the order fulfillment process, MCI earned an extra $30 million in revenue, Holmes said.

"We're still doing batch processing but in batches of one," he said.

"We're still doing batch processing but in batches of one," said MCI's Ralph Holmes.

Ironically, MCI had built its own messaging product in 1987 that was intended to improve the performance of CICS applications by enabling them to be split among separate MVS machines. By 1990, MCI had about a dozen programmers devoted exclusively to maintaining MCI's messaging software on MVS CICS. That's when MCI decided to call in Covia, Holmes said.

"We didn't have the money or expertise to port our middleware to other platforms, and we were struggling to maintain just what we had in place already," he explained. "We were glad to put all of that responsibility into Covia's hands."

However, MCI kept its proprietary messaging API, which maps neatly with Covia's. This insulated MCI's applications from changes if MCI decides to switch middleware vendors, he said.

Codex

Continued from page 1

support as many as 1,000 LAN, serial, voice and video ports.

The switch will handle subrate, Nx64K bit/sec, fractional T-1, T-1/E-1 and T-3 links, as well as frame relay interfaces. According to sources, the switch will support a maximum of six T-3s and 64 T-1s. The switch will also provide circuit switching as an option for constant bit-rate traffic, such as a videoconference. Wrapping that traffic in cells could introduce unnecessary overhead and delays.

But the distinguishing feature of the SoftCell switch will be its ability to support variable cell sizes up to and including the standard 53-byte ATM cell. The variable sizes are intended to provide more efficient packaging and transmission of voice, data and video traffic at subrate, 64K bit/sec and T-1 speeds.

"There's an enormous installed base of T-1 nets that can benefit from increased bandwidth efficiency by using a cell-based architecture," said Kathryn Korostoff, a principal at Sage Network Research in Newton, Mass. "One important feature of the Codex switch is that it will provide cell switching at T-1."

For example, an IBM Systems Network Architecture transaction, such as a poll acknowledgment, might take up 60 bytes instead of 53 bytes. Part of the acknowledgment would fill an ATM cell, while the remainder would only use a small portion of another cell, leaving the rest of that cell empty as it shoots over the net. But the SoftCell switch could transmit the acknowledgment in two 30-byte cells, saving bandwidth.

Sources said SoftCell will also feature voice compression at 16-to-1 and data compression at 10-to-1, depending on the application. The switch is fully fault-tolerant with redundant processors and power supplies.

Observers said the switch will compete with Cascade Communications Corp.'s Broadband-STDX (B-SYDX) 9000 switch announced earlier this year (*NW*, Feb. 22, page 6). The B-STDX is a 1.2G bit/sec bus-based switch with 14 I/O slots that can support a maximum of 112 E-1, 56 T-1 and 14 T-3 or 45M bit/sec ATM wide-area links. It is priced from $30,000 to $160,000.

The B-STDX 9000 also provides a variable frame feature, called QuickPath, that allows users to access frame relay and ATM services.

The switch will also compete with LightStream's 2010 ATM switch, which is a 12-slot matrix switch with an aggregate throughput of 2G bit/sec. Pricing for the 2010 starts at $25,000.

According to sources, the SoftCell switch will eventually replace Motorola Codex's 6290 fast packet switch manufactured by StrataCom. Motorola Codex is expected to service and support existing 6290 accounts and target the SoftCell switch for new accounts.

SoftCell is expected to go into field trials this quarter and ship in the first quarter of 1994. The switch will cost about $60,000 for a two-LAN, two-trunk configuration, sources said.

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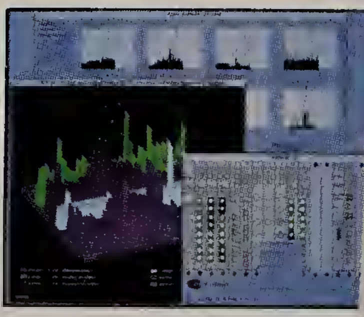

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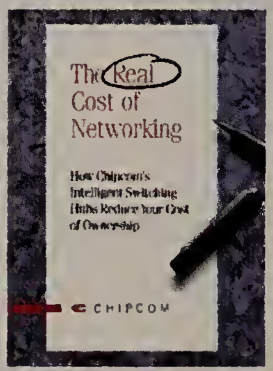

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